

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Low-voltage surge protective devices –
Part 01: General Requirements and test methods**

**Parafoudres basse tension –
Partie 01: Exigences générales et méthodes d'essai**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Low-voltage surge protective devices –
Part 01: General Requirements and test methods**

**Parafoudres basse tension –
Partie 01: Exigences générales et méthodes d'essai**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.240.10

ISBN 978-2-8322-4974-1

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms, definitions, abbreviated terms and symbols.....	11
3.1 Terms and definitions.....	11
3.2 Abbreviated terms and symbols	22
4 Classification.....	23
4.1 General.....	23
4.2 Number of ports	23
4.2.1 One	23
4.2.2 Two	23
4.3 SPD design.....	23
4.3.1 Voltage switching.....	23
4.3.2 Voltage limiting.....	23
4.3.3 Combination	23
4.4 Mode of protection design.....	23
4.4.1 Voltage switching.....	23
4.4.2 Voltage limiting	23
4.4.3 Combination	23
4.5 Type of SPD	24
4.6 Environment	24
4.6.1 Indoor.....	24
4.6.2 Outdoor	24
4.6.3 Non submersible SPDs.....	24
4.6.4 Submersible SPDs.....	24
4.7 Accessibility.....	24
4.7.1 Accessible	24
4.7.2 Inaccessible	24
4.8 Mounting method	24
4.8.1 Fixed	24
4.8.2 Portable.....	24
4.9 Location of disconnecter (including overcurrent protection).....	25
4.9.1 Internal.....	25
4.9.2 External.....	25
4.9.3 Both (internal and external)	25
4.9.4 None	25
4.10 Degree of protection provided by enclosures according to IEC 60529 (IP code)	25
4.11 Temperature and humidity range.....	25
4.11.1 Normal.....	25
4.11.2 Extended	25
4.12 SPD modes of protection	25
4.12.1 SPD providing a single mode of protection	25
4.12.2 Multimode SPD.....	25
4.13 End-of-life mode of the SPDA	25
4.13.1 Open-circuit mode (OCM).....	25

4.13.2	Short-circuit mode (SCM)	25
4.14	Short-Circuit protection function for OCM end-of-life mode.....	25
4.14.1	Internal	25
4.14.2	External	26
5	Void.....	26
6	Marking and other product information.....	26
6.1	General.....	26
6.2	List of items	26
6.3	Information about status indicator	28
7	Service conditions	28
7.1	Voltage	28
7.2	Air pressure and altitude	29
7.3	Temperatures	29
7.4	Humidity	29
8	Requirements	29
8.1	General requirements	29
8.2	Marking.....	29
8.3	Electrical requirements	30
8.3.1	Protection against electric shock	30
8.3.2	Continuous current I_C	30
8.3.3	Protective conductor current I_{PE}	30
8.3.4	Measured limiting voltage	31
8.3.5	Operating duty.....	31
8.3.6	Safety performance of overstressed SPDs.....	31
8.3.7	Insulation resistance.....	32
8.3.8	Dielectric withstand	33
8.3.9	Behaviour under temporary overvoltages.....	33
8.4	Mechanical requirements	33
8.4.1	General	33
8.4.2	Screws, current carrying parts and connections	33
8.4.3	External connections	33
8.4.4	Air clearances and creepage distances.....	35
8.4.5	Mechanical strength.....	35
8.5	Environmental and material requirements	35
8.5.1	Protection provided by enclosure (IP code).....	35
8.5.2	Heat resistance	35
8.5.3	Resistance to abnormal heat and fire.....	35
8.5.4	Tracking resistance	36
8.5.5	Ageing behaviour under damp heat	36
8.5.6	Electromagnetic compatibility	36
8.6	Additional requirements for specific SPD designs	36
8.6.1	Two port SPDs and one port SPDs with separate input/output connections	36
8.6.2	Environmental stress for outdoor SPDs	37
8.6.3	SPDs with electrically separated circuits.....	37
8.6.4	Total Discharge Current I_{Total} , if declared by the manufacturer	37
8.6.5	Two port SPDs	37
8.6.6	Short-circuiting SPDs	38

8.7	Routine and acceptance tests	38
9	Tests	38
9.1	Type testing procedures	38
9.1.1	General	38
9.1.2	Impulse discharge current.....	43
9.1.3	8/20 current impulse	44
9.1.4	1,2/50 voltage impulse.....	45
9.1.5	Combination wave	45
9.2	Indelibility of markings	47
9.3	Electrical tests	48
9.3.1	Protection against direct contact.....	48
9.3.2	Continuous current I_C	48
9.3.3	Protective conductor current I_{PE}	49
9.3.4	Measured limiting voltage	49
9.3.5	Operating duty test	52
9.3.6	Safety performance of overstressed SPDs	58
9.3.7	Insulation resistance	65
9.3.8	Dielectric withstand	66
9.3.9	Behaviour under temporary overvoltages (TOVs).....	73
9.4	Mechanical tests	73
9.4.1	General	73
9.4.2	Reliability of screws, current-carrying parts and connections	73
9.4.3	Tests for external connections for copper conductors	75
9.4.4	Verification of air clearances and creepage distances.....	78
9.4.5	Mechanical strength.....	83
9.5	Environmental and material tests	86
9.5.1	Resistance to ingress of solid objects and to harmful ingress of water	86
9.5.2	Heat resistance	86
9.5.3	Resistance to abnormal heat and fire.....	88
9.5.4	Tracking resistance	89
9.5.5	Life test under damp heat.....	89
9.6	Additional tests for specific SPD designs	89
9.6.1	Tests for two-port SPDs and one-port SPDs with separate input/output connections	89
9.6.2	Environmental tests for outdoor SPDs	95
9.6.3	SPDs with separated circuits	96
9.6.4	Total discharge current test for multimode SPDs	96
9.6.5	Tests for two port SPDs only	96
Annex A (normative)	Routine and acceptance tests	99
A.1	Routine tests.....	99
A.2	Acceptance tests	99
Annex B (normative)	Tests to determine on SPD modes of protection with or without follow current.....	100
B.1	SPDs modes of protection and follow current.....	100
B.2	Follow current determination for SPD's combination mode of protection according to 4.4.3.1	100
Annex C (normative)	Temperature rise limits	101
Annex D (normative)	Environmental tests for outdoor SPDs.....	103

D.1	Non submersible SPDs	103
D.1.1	Accelerated aging test with UV radiation.....	103
D.1.2	Temperature cycling test	103
D.1.3	Verification of resistance to corrosion	104
D.2	Submersible SPDs	104
D.2.1	Water immersion test.....	104
D.2.2	Dielectric test	105
Annex E (normative)	Short-circuiting SPDs	106
E.1	General.....	106
E.2	Transition surge current rating test	106
E.2.1	General	106
E.2.2	Test to reach the short-circuit mode of a short-circuiting SPD	107
E.2.3	Impulse withstand test (in short-circuited condition).....	107
Annex F (normative)	Reduced test procedure for series connection of SPD's modes of protection	108
F.1	General.....	108
F.2	Reduced test procedure	108
Annex G (normative)	Test procedures for SPDs according to 4.14.1.4	109
G.1	General.....	109
G.2	Sample preparation and preconditioning for the short-circuit current behaviour test.....	109
G.2.1	Sample preparation	109
G.2.2	Preconditioning procedure	110
G.2.3	Pass criteria	111
G.3	Specific overstress test.....	111
G.3.1	Sample preparation	111
G.3.2	General test procedure	112
G.3.3	Pass criteria	113
Bibliography	114
Figure 1	– I/U characteristics for linear power source.....	39
Figure 2	– Metallic screen test setup.....	41
Figure 3	– Example of a decoupling network for single-phase power.....	46
Figure 4	– Example of a decoupling network for three-phase power.....	47
Figure 5	– Alternate test for the measured limiting voltage	47
Figure 6	– Flow chart of testing to check the voltage protection level U_p	50
Figure 7	– Flow chart for the operating duty tests according 9.3.5.3, 9.3.5.4 and 9.3.5.6	53
Figure 8	– Example of test set-up for operating duty test	54
Figure 9	– Operating duty test timing diagram for T1 SPDs and T2 SPDs	55
Figure 10	– Additional duty test timing diagram for T1 SPD.....	56
Figure 11	– Flow chart for the additional test for SPDs with follow current	57
Figure 12	– Example for test circuit for thermal protection test.....	61
Figure 13	– Test apparatus for impact test.....	83
Figure 14	– Striking element of the pendulum hammer.....	84
Figure 15	– Ball pressure test arrangement.....	87
Figure 16	– Pressure ball of loading device.....	87

Figure 17 – Examples of appropriate test circuits for the rated load current test.....	91
Figure 18 – Examples for appropriate test circuits of the load side short-circuit test(s).....	95
Figure 19 – Example of test set-up for load side surge operating duty test.....	97
Figure E.1 – Differences in test procedure for short circuiting SPDs.....	106
Figure G.1 – Sample preparation for preconditioning test.....	110
Figure G.2 – Example of test setup for preconditioning	110
Figure G.3 – Example of test setup for specific overstress test	112
Figure G.4 – Typical timing diagram for specific overstress test.....	113
Table 1 – List of abbreviated terms and symbols.....	22
Table 2 – Type of SPD.....	24
Table 3 – Pass criteria for type tests	42
Table 4 – Example parameters for impulse discharge current	44
Table 5 – Tests to be performed to determine the measured limiting voltage	51
Table 6 – Prospective short circuit current to be applied depending on the maximum overcurrent protection specified, for fuses of the gG type.....	63
Table 7 – Dielectric impulse withstand test voltages for SPD main circuits.....	67
Table 8 – Dielectric AC test voltages for SPD main circuits.....	68
Table 9 – Dielectric AC test voltages for SPD main circuits.....	68
Table 10 – Dielectric impulse withstand test voltages for separated circuits	69
Table 11 – Dielectric AC test voltages for separated circuits	70
Table 12 – Dielectric AC test voltages for separated circuits.....	71
Table 13 – Dielectric AC test voltages between circuits with protective separation (double/reinforced insulation) according to 9.3.7.2 c) and d)	72
Table 14 – Impulse test voltages for verifying clearances at different altitudes.....	73
Table 15 – Screw thread diameters and applied torques	74
Table 16 – Cross-sections of copper conductors for screw-type or screwless terminals	75
Table 17 – Conductor dimensions	76
Table 18 – Pulling forces (screw terminals and bolted connections).....	76
Table 19 – Pulling forces (screwless terminals).....	77
Table 20 – Air clearances for SPD main circuit(s)	79
Table 21 – Air clearances for electrically separated circuits	80
Table 22 – Creepage distances for SPDs.....	81
Table 23 – Relationship between material groups and classifications.....	82
Table 24 – Fall distances for impact requirements	85
Table 25 – Test conductors for rated load current test	92
Table 26 – Trip current factor k for overload behaviour	93
Table 27 – Tolerances for proportional impulse currents	96
Table C.1 – Temperature-rise limits	102
Table F.1 – Reduced test procedure for the mode of protection provided by a series connection of modes of protection according to F.1	108

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –**Part 01: General requirements and test methods**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61643-01 has been prepared by subcommittee SC37A Low-voltage surge protective devices, of IEC technical committee 37: Surge arresters. It is an International Standard.

This document, together with IEC 61643-11:—¹ (second edition), cancels and replaces the first edition of IEC 61643-11 published in 2011. This edition constitutes a technical revision.

¹ Under preparation. Stage at the time of publication: IEC/AFDIS 61643-11:2024.

This edition includes the following significant technical changes with respect to the first edition of IEC 61643-11:

- a) Clarification on test application either to a complete SPD, to a "mode of protection", or to a complete "SPD assembly";
- b) Additional measurement of voltage protection level on "combined modes of protection" between live conductors and PE (see new Annex F);
- c) Additional duty test for T1 SPD and T2 SPD with follow current to check for increased follow current at lower impulse current amplitude (see 9.3.5.5);
- d) Modified and amended short circuit current test requirements to better cover up-to-date internal SPD disconnecter technologies (see 9.3.6.3);
- e) Improved dielectric test requirements for the SPD's main circuits and added dielectric test requirements for "electrically separated circuits" (see 9.3.7 and 9.3.8);
- f) Additional clearance requirements for "electrically separated circuits" (see 9.4.4);
- g) Additional information and details for SPDs for DC installations.

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

Draft	Report on voting
37A/419/FDIS	37A/422/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 61643 series, published under the general title *Low-voltage surge protective devices*, 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

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This document is a product family standard dealing with the safety and performance of Surge Protective Devices (SPDs) and takes precedence over horizontal and generic standards covering the same subject.

This part of IEC 61643 addresses the general safety and performance tests for SPDs.

This document recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of SPDs when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice.

This document takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the SPD is connected to the supply mains. However, national wiring rules might differ.

If the intended applications of an SPD are covered by different parts of the IEC 61643-X1 series of standards, all relevant parts are applied.

This document is only to be applied together with the latest edition of one or more of the subsequent parts of the IEC 61643-X1 series of standards.

SPDs containing additional features or functions not addressed in this document and the relevant subsequent part(s) can require additional consideration and tests to ensure the main SPD function is not adversely affected and no hazards can arise from these additional features or functions. If appropriate standards exist to cover such functions, they are to be applied.

There are three SPD Types for SPDs intended to be installed in power systems:

T1 SPDs are subjected to impulses simulating conducted partial lightning currents.

T2 SPDs and T3 SPDs are subjected to impulses of shorter duration.

LOW-VOLTAGE SURGE PROTECTIVE DEVICES –

Part 01: General requirements and test methods

1 Scope

This part of IEC 61643 contains the common requirements for all SPDs.

This document is applicable to devices for surge protection against indirect and direct effects of lightning or other transient overvoltages, hereafter referred to as Surge Protective Devices (SPDs).

SPDs are intended to be connected to circuits or equipment rated up to 1 000 V AC (RMS) or 1 500 V DC. Performance and safety requirements, tests and ratings are specified in this document. SPDs contain at least one nonlinear component and are intended to limit surge voltages and divert surge currents.

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

IEC 60068-2-11:2021, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-14:2023, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60099-4:2014, *Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60269 (all parts), *Low-voltage fuses*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60898(all parts), *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60947-2:2016, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*
IEC 60947-2:2016/AMD1:2019

IEC 61000 (all parts), *Electromagnetic compatibility (EMC)*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC TR 61643-03:2024, *Low-voltage surge protective devices – Part 03: SPD testing guide*

IEC 61643-11:—², *Low-voltage surge protective devices – Part 11: Surge protective devices connected to AC low-voltage power systems – Requirements and test methods*

3 Terms, definitions, abbreviated terms and symbols

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1 Terms and definitions

3.1.1

1,2/50 voltage impulse

voltage impulse with a nominal virtual front time of 1,2 μs and a nominal time to half-value of 50 μs

Note 1 to entry: IEC 60060-1 provides the voltage impulse definitions of front time, time to half-value and waveshape.

3.1.2

8/20 current impulse

current impulse with a nominal virtual front time of 8 μs and a nominal time to half-value of 20 μs

Note 1 to entry: IEC 62475 provides the current impulse definitions of front time, time to half-value and waveshape.

² Under preparation. Stage at the time of publication: IEC/AFDIS 61643-11:2024.