

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Surge arresters – iTeh STANDARD PREVIEW
Part 8: Metal-oxide surge arresters with external series gap (EGLA) for overhead transmission and distribution lines of a.c. systems above 1 kV
(standards.iteh.ai)

Parafoudres – IEC 60099-8:2017
Partie 8: Parafoudres à oxyde métallique avec éclateur extérieur en série (EGLA) pour lignes aériennes de transmission et de distribution de réseaux à courant alternatif de plus de 1 kV



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 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 Central Office
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 corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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 Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

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 also 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.

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.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 21 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

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.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

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 aussi 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.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Surge arresters – iTeh STANDARD PREVIEW

Part 8: Metal-oxide surge arresters with external series gap (EGLA) for overhead transmission and distribution lines of a.c. systems above 1 kV

<https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-72551210160099-8-2017>

Parafoudres – <https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-72551210160099-8-2017>

Partie 8: Parafoudres à oxyde métallique avec éclateur extérieur en série (EGLA) pour lignes aériennes de transmission et de distribution de réseaux à courant alternatif de plus de 1 kV

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.240.10

ISBN 978-2-8322-6106-4

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.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	10
4 Identification and classification	13
4.1 EGLA identification	13
4.2 EGLA classification.....	13
5 Standard ratings and service conditions	14
5.1 Standard rated voltages	14
5.2 Standard rated frequencies.....	14
5.3 Standard nominal discharge currents	14
5.4 Service conditions.....	14
5.4.1 Normal service conditions.....	14
5.4.2 Special service conditions	14
6 Requirements	15
6.1 Insulation withstand of the SVU and the complete EGLA.....	15
6.1.1 Insulation withstand of the housing of the SVU	15
6.1.2 Insulation withstand of EGLA with shorted (failed) SVU	15
6.2 Residual voltages	15
6.3 High current duty	15
6.4 Lightning discharge capability.....	15
6.5 Short-circuit performance of the SVU.....	15
6.6 Mechanical performance	16
6.7 Weather aging of SVU	16
6.8 Reference voltage of the SVU	16
6.9 Internal partial discharges.....	16
6.10 Coordination between insulator withstand and EGLA protective level.....	16
6.11 Follow current interrupting	17
6.12 Electromagnetic compatibility.....	17
6.13 End of life	17
7 General testing procedure	17
7.1 Measuring equipment and uncertainty.....	17
7.2 Test samples	17
8 Type tests	18
8.1 General.....	18
8.2 Insulation withstand tests on the SVU housing and on the EGLA with failed SVU.....	18
8.2.1 General	18
8.2.2 Insulation withstand test on the SVU housing	19
8.2.3 Insulation withstand tests on EGLA with failed SVU	19
8.3 Residual voltage tests.....	20
8.3.1 General	20
8.3.2 Procedure for correction and calculation of inductive voltages	20
8.3.3 Lightning current impulse residual voltage test	21

8.3.4	High current impulse residual voltage test	22
8.4	Standard lightning impulse sparkover test	22
8.5	High current impulse withstand test.....	23
8.5.1	Selection of test samples	23
8.5.2	Test procedure	23
8.5.3	Test evaluation	24
8.6	Test to verify the repetitive charge transfer rating, Q_{RS} with lightning discharges	24
8.6.1	MO resistors	24
8.6.2	Series gap	26
8.7	Short-circuit tests.....	27
8.7.1	General	27
8.7.2	Preparation of the test samples	28
8.7.3	Mounting of the test sample.....	29
8.7.4	High-current short-circuit tests.....	30
8.7.5	Low-current short-circuit test	32
8.7.6	Evaluation of test results	32
8.8	Follow current interrupting test.....	38
8.8.1	General	38
8.8.2	"Test method A".....	38
8.8.3	"Test method B".....	40
8.9	Mechanical load tests on the SVU.....	42
8.9.1	General	42
8.9.2	Bending test	42
8.9.3	Vibration test.....	51
8.10	Weather aging tests.....	52
8.10.1	General	52
8.10.2	Sample preparation	52
8.10.3	Test procedure	52
8.10.4	Test evaluation	52
8.10.5	Additional test procedure for polymer (composite and cast resin) housed SVUs.....	53
8.11	Radio interference voltage (RIV) test	53
9	Routine tests	53
9.1	General.....	53
10	Acceptance tests	54
10.1	General.....	54
10.2	Reference voltage measurement of SVU.....	54
10.3	Internal partial discharge test of SVU.....	55
10.4	Radio interference voltage (RIV) test	55
10.5	Test for coordination between insulator withstand and EGLA protective level.....	55
10.5.1	General	55
10.5.2	Steep front impulse test.....	55
10.5.3	Standard lightning impulse sparkover test.....	56
10.6	Follow current interrupting test.....	56
10.6.1	General	56
10.6.2	Test procedure	57
10.6.3	Test sequence	57
10.6.4	Test evaluation	57

10.7	Vibration test on the SVU with attached electrode	57
10.7.1	General	57
10.7.2	Sample preparation	57
10.7.3	Test procedure and test condition	57
10.7.4	Test evaluation	58
Annex A (informative)	Example of a test circuit for the follow current interrupting test	59
Annex B (normative)	Mechanical considerations	60
B.1	Test of bending moment	60
B.2	Definition of mechanical loads	61
B.3	Definition of seal leak rate	62
B.4	Calculation of wind-bending-moment	63
B.5	Flow chart – Procedures of tests of bending moment for porcelain/cast resin and polymer-housed SVUs	64
Annex C (normative)	Special service conditions	65
C.1	General	65
C.2	Temperature in excess of +40 °C or below –40 °C	65
C.3	Application at altitudes higher than 1 000 m	65
C.4	Fumes or vapours that may cause deterioration of insulating surface or mounting hardware	65
C.5	Excessive contamination by smoke, dirt, salt spray or other conducting materials	65
C.6	Excessive exposure to moisture, humidity, dripping water, or steam	65
C.7	Live washing of arrester	65
C.8	Unusual transportation or storage	65
C.9	Non-vertical erection and suspended erection	66
C.10	Wind speed > 34 m/s	66
C.11	Earthquake	66
C.12	Torsional loading of the arrester	66
Bibliography	67
Figure 1	– Configuration of an EGLA with insulator and arcing horn	8
Figure 2	– Test procedure to verify the repetitive charge transfer rating, Q_{RS}	25
Figure 3	– Test procedure to verify the repetitive charge withstand of the series gap	27
Figure 4	– Examples of SVU units	36
Figure 5	– Short-circuit test setup	37
Figure 6	– Example of a test circuit for re-applying pre-failing circuit immediately before applying the short-circuit test current	38
Figure 7	– Thermo-mechanical test	46
Figure 8	– Example of the test arrangement for the thermo-mechanical test and direction of the cantilever load	47
Figure 9	– Test sequence of the water immersion test	48
Figure A.1	– Example of a test circuit for the follow current interrupting test	59
Figure B.1	– Bending moment – Multi-unit SVU	60
Figure B.2	– Definition of mechanical loads	61
Figure B.3	– SVU unit	62
Figure B.4	– SVU dimensions	63

Figure B.5 – Procedures of tests of bending moment for porcelain/cast resin and polymer-housed SVUs	64
Table 1 – EGLA classification – “Series X” and “Series Y”	13
Table 2 – Steps of rated voltages (r.m.s. values)	14
Table 3 – Type tests (all tests to be performed with or without insulator assembly; by manufacturer's decision)	18
Table 4 – Test requirements	34
Table 5 – Required currents for short-circuit tests	35
Table 6 – Acceptance tests	54
Table 7 – Virtual steepness of wave front of steep front impulses	55

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 60099-8:2017](https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76efc662b0/iec-60099-8-2017)

<https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76efc662b0/iec-60099-8-2017>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SURGE ARRESTERS –**Part 8: Metal-oxide surge arresters with external series gap (EGLA)
for overhead transmission and distribution lines
of a.c. systems above 1 kV**

FOREWORD

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

International Standard IEC 60099-8 has been prepared by IEC technical committee 37: Surge arresters.

This bilingual version (2018-10) corresponds to the monolingual English version, published in 2017-11.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

- a) The Lightning discharge capability test has been completely re-written and re-named to Test to verify the repetitive charge transfer rating, Qrs with lightning discharges to reflect

changes introduced in IEC 60099-4 Ed. 3 (2014) regarding new methods for rating the energy and charge handling capability of metal-oxide arresters. In addition to testing to evaluate the performance of the MO resistors, procedures for evaluating the performance of the EGLA series gaps have been introduced.

- b) Omissions from Ed. 1 of this standard have been included, notably an RIV test and a means for determining the thermal time constant of the SUV portion of the EGLA.
- c) Definitions for new terms have been added
- d) A number of NOTES in Ed. 1 have been converted to normative requirements

A number of editorial changes have been made throughout the document to improve grammar and general flow of information.

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

FDIS	Report on voting
37/436/FDIS	37/438/RVD

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

The French version of this standard has not been voted upon.

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

A list of all parts of IEC 60098 series, under the general title *Surge arresters*, can be found on the IEC website.

[IEC 60099-8:2017](https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76cf362b0/iec-60099-8-2017)

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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

This part of IEC 60099 applies to the externally gapped line arrester (EGLA)

This type of surge arrester is connected directly in parallel with an insulator assembly. It comprises a series varistor unit (SVU), made up from non-linear metal-oxide resistors encapsulated in a polymer or porcelain housing, and an external series gap (see Figure 1).

The purpose of an EGLA is to protect the parallel-connected insulator assembly from lightning-caused over-voltages. The external series gap, therefore, should spark over only due to fast-front over-voltages. The gap should withstand all power-frequency and slow-front over-voltages occurring on the system.

In the event of SVU failure, the external series gap should be able to isolate the SVU from the system.

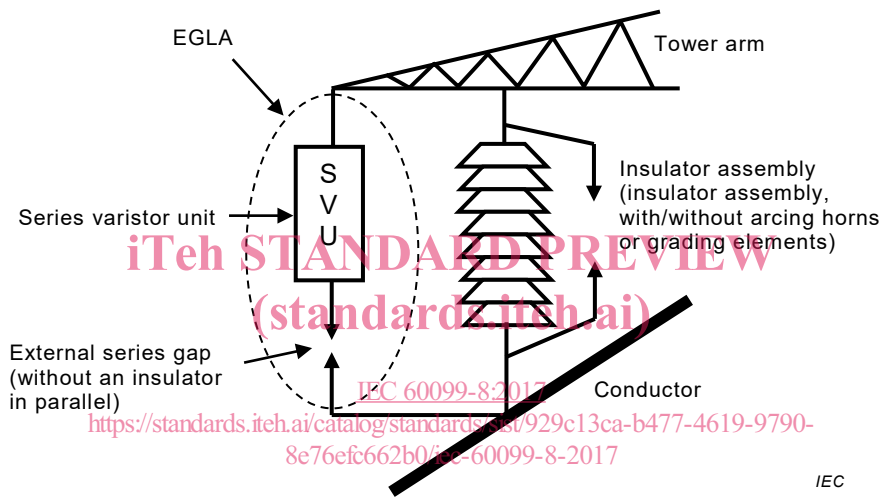


Figure 1 – Configuration of an EGLA with insulator and arcing horn

SURGE ARRESTERS –

Part 8: Metal-oxide surge arresters with external series gap (EGLA) for overhead transmission and distribution lines of a.c. systems above 1 kV

1 Scope

This part of IEC 60099 covers metal-oxide surge arresters with external series gap (externally gapped line arresters (EGLA)) that are applied on overhead transmission and distribution lines, only to protect insulator assemblies from lightning-caused flashovers.

This document defines surge arresters to protect the insulator assembly from lightning-caused over-voltages only. Therefore, and since metal-oxide resistors are not permanently connected to the line, the following items are not considered for this document:

- switching impulse spark-over voltage;
- residual voltage at steep current and switching current impulse;
- thermal stability;
- long-duration current impulse withstand duty;
- power-frequency voltage versus time characteristics of an arrester;
- disconnecter test;
- aging duties by power-frequency voltage.

Considering the particular design concept and the special application on overhead transmission and distribution lines, some unique requirements and tests are introduced, such as the verification test for coordination between insulator withstand and EGLA protective level, the follow current interrupting test, mechanical load tests, etc.

Designs with the EGLA's external series gap installed in parallel to an insulator are not covered by this document.

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 60060-2:2010, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60068-2-11:1981, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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

IEC 60270:2000, *High-voltage test techniques – Partial discharge measurements*

IEC 60507:2013, *Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems*

IEC TS 60815-1:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC 62217:2012, *Polymeric HV insulators for indoor and outdoor use – General definitions, test methods and acceptance criteria*

ISO 4287, *Geometrical Product Specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters*

ISO 4892-1, *Plastics – Methods of exposure to laboratory light sources – Part 1: General Guidance*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc sources*

ISO 4892-3, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*

STANDARD PREVIEW
(standards.iteh.ai)

3 Terms and definitions

IEC 60099-8:2017

[https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-](https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-929c13ca-b477-4619-9790)

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

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

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

3.1

externally gapped line arrester

EGLA

arrester designed for installation on overhead lines to protect an insulator assembly from lightning-caused fast-front over-voltages only

Note 1 to entry: This is accomplished by raising the spark-over level of the external series gap to a level that isolates the arrester from power-frequency over-voltages and from the worst case slow-front over-voltages due to switching and fault events expected on the line to which it is applied.

3.2

series varistor unit

SVU

non-linear metal-oxide resistor part, contained in a housing, which must be connected with an external series gap to construct the complete arrester

Note 1 to entry: The series varistor unit may include several units.

3.3

section of an EGLA

complete, suitably assembled part of a complete EGLA necessary to represent the behaviour of a complete EGLA with respect to a particular test

3.4 section of an SVU

complete, suitably assembled part of an SVU unit necessary to represent the behaviour of an SVU with respect to a particular test

3.5 unit of an SVU

completely housed part of an SVU which may be connected in series and/or in parallel with other units of an SVU to construct, in combination with the external series gap, an EGLA of higher voltage and/or current rating

3.6 rated voltage of an EGLA

U_r

maximum permissible r.m.s. value of power-frequency voltage that can be applied continuously between the EGLA terminals, and at which it is designed to operate correctly

Note 1 to entry: The rated voltage is used as a reference parameter for the specification of operating and current interrupting characteristics.

Note 2 to entry: The rated voltage of an EGLA is comparable to U_c of all other types of MO-arresters.

3.7 reference voltage of an SVU

U_{ref}

peak value of power-frequency voltage divided by $\sqrt{2}$, which should be applied to the SVU to obtain the reference current

Note 1 to entry: The reference voltage of a multi-unit SVU is the sum of the reference voltages of the individual units.

[IEC 60099-8:2017](https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76efc662b0/iec-60099-8-2017)

3.8 reference current of an SVU

I_{ref}

peak value (the higher peak value of the two polarities if the current is asymmetrical) of the resistive component of a power-frequency current used to determine the reference voltage of the SVU

Note 1 to entry: The reference current should be high enough to make the effects of stray capacitances at the measured reference voltage of the SVU units negligible. It is to be specified by the manufacturer.

Note 2 to entry: Depending on the nominal discharge current of the EGLA, the reference current will be typically in the range of 0,05 mA to 1,0 mA per square centimetre of metal-oxide resistor area for a single column SVU.

3.9 rated short-circuit current of an SVU

I_s

r.m.s. value of the highest short-circuit current under which the SVU will not fail in a manner that causes violent shattering of the housing and under which self-extinguishing of open flames (if any) will occur within a defined period of time

3.10 residual voltage of an EGLA

peak value of voltage that appears across the terminal-to-terminal length of the EGLA including series gap and connection leads during the passage of discharge current

3.11 residual voltage of an SVU

peak value of voltage that appears between the terminals of the SVU during the passage of discharge current

3.12**surface leakage current of an SVU**

current that flows on the surface of the SVU

3.13**follow current**

I_{follow}

the current immediately following an impulse through an EGLA with the power-frequency voltage as the source

3.14**specified long-term load of an SVU**

SLL

mechanical force perpendicular to the longitudinal axis of an SVU, allowed to be continuously applied during service without causing any mechanical damage to the SVU

3.15**specified short-term load of an SVU**

SSL

greatest mechanical force perpendicular to the longitudinal axis of an SVU, allowed to be applied during service for short periods and for relatively rare events (for example, short-circuit current loads and extreme wind gusts) without causing any mechanical damage to the SVU

3.16**mean breaking load of an SVU**

MBL

average breaking load for porcelain or cast resin-housed SVUs determined from tests

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 60099-8:2017](https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76efc662b0/iec-60099-8-2017)

3.17**high current impulse**

MBL

peak value of discharge current having a 4/10 or 2/20 impulse shape, which is used to test the withstand capability of the SVU on extreme lightning occasions

<https://standards.iteh.ai/catalog/standards/sist/929c13ca-b477-4619-9790-8e76efc662b0/iec-60099-8-2017>

3.18**salt deposit density**

SDD

amount of salt in the deposit on a given surface of the SVU housing, divided by the area of this surface; generally expressed in mg/cm²

3.19**verification test for coordination between insulator withstand and EGLA protective level**

test used to verify that the EGLA will exhibit correct sparkover operation and clamp the overvoltage caused by lightning considerably lower than the flashover voltage of the parallel-connected insulator assembly

3.20**vibration withstand test**

test to verify that the SVU and its connectors can withstand the specified mechanical vibration levels

3.21**lightning impulse discharge**

approximately sine half-wave current impulse having a time duration within 200 μs to 230 μs during which the instantaneous value of the impulse current is between 5 % and 100 % of its peak value

3.22 repetitive charge transfer rating

Q_{rs}
maximum specified charge transfer capability of an EGLA, in the form of a single event or group of surges that may be transferred through an EGLA without causing mechanical failure or unacceptable electrical degradation to the MO resistors

Note 1 to entry: The charge is calculated as the absolute value of current integrated over time. For the purpose of this standard this is the charge that is accumulated in a single event or group of surges lasting for not more than 2 s and which may be followed by a subsequent event at a time interval not shorter than 60 s.

4 Identification and classification

4.1 EGLA identification

An EGLA shall be identified by the following minimum information, which shall appear on a nameplate permanently attached to the arrester:

- rated voltage U_r in kV;
- rated frequency in Hz, only if it is less than 48 Hz or larger than 62 Hz;
- classification series information (examples: "X1", "Y2");
- rated short-circuit current I_s in kA;
- manufacturer's name or trade mark;
- year of manufacture;
- serial number (at least for arresters for $U_s > 52$ kV);
- lightning discharge capability (only charge value) in C; example: "0.4 C".

Information on required gap spacing, including tolerances shall be given in an appropriate way, for example in the manual.

4.2 EGLA classification

EGLAs are classified by their nominal discharge currents and their high current impulse withstand capabilities as per Table 1, and they shall meet at least the test requirements and performance characteristics specified in Table 3. These arresters have no operating duties for slow-front surges and power-frequency over-voltages.

Table 1 – EGLA classification – "Series X" and "Series Y"

Series X					Series Y				
Class name	X1	X2	X3	X4	Class name	Y1	Y2	Y3	Y4
Nominal discharge current (kA), 8/20	5	5	10	20	Nominal discharge current (kA), 2/20	5	10	15	20
High current impulse (kA), 4/10	40	65	100	100	High current impulse (kA), 2/20	10	25	40	65
<p>"Series X" corresponds to the classification used in IEC 60099-4. A nominal discharge current of 8/20 wave shape and a high current impulse of 4/10 wave shape are used in IEC and in IEEE standards. "Series Y" corresponds to the classification applied e.g. in Japan on shielded line applications. Specification of wave shape 2/20 both for the nominal discharge current and for the high current impulse is based on this special application.</p> <p>According to service conditions, other high current impulse values than those specified in this table may be applied.</p>									