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IEC/TS 60815-1

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TECHNICAL SPECIFICATION

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	4
1 Scope and object.....	6
2 Normative references	7
3 Terms, definitions and abbreviations	7
3.1 Terms and definitions	7
3.2 Abbreviations	9
4 Proposed approaches for the selection and dimensioning of an insulator.....	9
4.1 Approach 1.....	10
4.2 Approach 2.....	10
4.3 Approach 3.....	10
5 Input parameters for the selection and dimensioning of insulators	12
6 System requirements.....	12
7 Environmental conditions.....	13
7.1 Identification of types of pollution	13
7.1.1 Type A pollution	13
7.1.2 Type B pollution	14
7.2 General types of environments.....	14
7.3 Pollution severity.....	15
8 Evaluation of site pollution severity (SPS)	15
8.1 Site pollution severity	15
8.2 Site pollution severity evaluation methods.....	16
8.3 Site pollution severity (SPS) classes	17
9 Insulation selection and dimensioning	20
9.1 General description of the process	20
9.2 General guidance on materials.....	21
9.3 General guidance on profiles.....	21
9.4 Considerations on creepage distance and insulator length	23
9.5 Considerations for exceptional or specific applications or environments	23
9.5.1 Hollow insulators	23
9.5.2 Arid areas.....	24
9.5.3 Proximity effects	24
9.5.4 Orientation	24
9.5.5 Maintenance and palliative methods	25
Annex A (informative) Flowchart representation of the design approaches.....	26
Annex B (informative) Pollution flashover mechanisms	29
Annex C (normative) Measurement of ESDD and NSDD	32
Annex D (normative) Evaluation of type B pollution severity.....	38
Annex E (normative) Directional dust deposit gauge measurements	40
Annex F (normative) Use of laboratory test methods.....	44
Annex G (normative) Deterministic and statistical approaches for artificial pollution test severity and acceptance criteria	45
Annex H (informative) Example of a questionnaire to collect information on the behaviour of insulators in polluted areas.....	48
Annex I (informative) Form factor.....	51
Annex J (informative) Correspondence between specific creepage distance and USCD.....	52

Bibliography.....	53
Figure 1 – Type A site pollution severity – Relation between ESDD/NSDD and SPS for the reference cap and pin insulator	18
Figure 2 – Type A site pollution severity – Relation between ESDD/NSDD and SPS for the reference long rod insulator	18
Figure 3 – Type B site pollution severity – Relation between SES and SPS for reference insulators or a monitor	19
Figure C.1 – Insulator strings for measuring ESDD and NSDD	32
Figure C.2 – Wiping of pollutants on insulator surface.....	34
Figure C.3 – Value of b	35
Figure C.4 – Relation between σ_{20} and Sa	36
Figure C.5 – Procedure for measuring NSDD.....	37
Figure E.1 – Directional dust deposit gauges	40
Figure G.1 – Illustration for design based on the deterministic approach.....	46
Figure G.2 – Stress/strength concept for calculation of risk for pollution flashover	46
Figure H.1 – Form factor	51
Table 1 – The three approaches to insulator selection and dimensioning	11
Table 2 – Input parameters for insulator selection and dimensioning.....	12
Table 3 – Directional dust deposit gauge pollution index in relation to SPS class.....	19
Table 4 – Correction of site pollution severity class as a function of DDDG NSD levels.....	19
Table 5 – Examples of typical environments	20
Table 6 – Typical profiles and their main characteristics	22
Table D.1 – Directional dust deposit gauge pollution index in relation to site pollution severity class.....	42
Table D.2 – Correction of site pollution severity class as a function of DDDG NSD levels.....	42
Table J.1 – Correspondence between specific creepage distance and unified specific creepage distance	52

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SELECTION AND DIMENSIONING OF HIGH-VOLTAGE INSULATORS INTENDED FOR USE IN POLLUTED CONDITIONS –

Part 1: Definitions, information and general principles

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC/TS 60815-1, which is a technical specification, has been prepared by IEC technical committee 36: Insulators.

This first edition of IEC/TS 60815-1 cancels and replaces IEC/TR 60815, which was issued as a technical report in 1986. It constitutes a technical revision and now has the status of a technical specification.

The following major changes have been made with respect to IEC/TR 60815:

- Encouragement of the use of site pollution severity measurements, preferably over at least a year, in order to classify a site instead of the previous qualitative assessment (see below).
- Recognition that “solid” pollution on insulators has two components, one soluble quantified by ESDD, the other insoluble quantified by NSDD.
- Recognition that in some cases measurement of layer conductivity should be used for SPS determination.
- Use of the results of natural and artificial pollution tests to help with dimensioning and to gain more experience in order to promote future studies to establish a correlation between site and laboratory severities.
- Recognition that creepage length is not always the sole determining parameter.
- Recognition of the influence other geometry parameters and of the varying importance of parameters according to the size, type and material of insulators.
- Recognition of the varying importance of parameters according to the type of pollution.
- The adoption of correction factors to attempt to take into account the influence of the above pollution and insulator parameters.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
36/264/DTS	36/270/RVC

Full information on the voting for the approval of this technical specification 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 the parts in the future IEC 60815 series, under the general title *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

SELECTION AND DIMENSIONING OF HIGH-VOLTAGE INSULATORS INTENDED FOR USE IN POLLUTED CONDITIONS –

Part 1: Definitions, information and general principles

1 Scope and object

IEC/TS 60815-1, which is a technical specification, is applicable to the selection of insulators, and the determination of their relevant dimensions, to be used in high-voltage systems with respect to pollution. For the purposes of this technical specification, the insulators are divided into the following broad categories, each dealt with in a specific part as follows:

- IEC/TS 60815-2 – Ceramic and glass insulators for a.c. systems;
- IEC/TS 60815-3 – Polymeric insulators for a.c. systems;
- IEC/TS 60815-4 – *equivalent to 60815-2 for d.c. systems*¹;
- IEC/TS 60815-5 – *equivalent to 60815-3 for d.c. systems*¹.

This part of IEC 60815 gives general definitions, methods for the evaluation of pollution site severity (SPS) and outlines the principles to arrive at an informed judgement on the probable behaviour of a given insulator in certain pollution environments.

This technical specification is generally applicable to all types of external insulation, including insulation forming part of other apparatus. The term “insulator” is used hereafter to refer to any type of insulator.

CIGRE C4 documents [1], [2], [3]², form a useful complement to this technical specification for those wishing to study in greater depth the performance of insulators under pollution.

This technical specification does not deal with the effects of snow, ice or altitude on polluted insulators. Although this subject is dealt with by CIGRE [1], [4], current knowledge is very limited and practice is too diverse.

The object of this technical specification is to

- understand and identify parameters of the system, application, equipment and site influencing the pollution behaviour of insulators,
- understand and choose the appropriate approach to the design and selection of the insulator solution, based on available data, time and resources,
- characterize the type of pollution at a site and determine the site pollution severity (SPS),
- determine the reference unified specific creepage distance (USCD) from the SPS,
- determine the corrections to the “reference” USCD to take into account the specific properties (notably insulator profile) of the “candidate” insulators for the site, application and system type,
- determine the relative advantages and disadvantages of the possible solutions,
- assess the need and merits of “hybrid” solutions or palliative measures,
- if required, determine the appropriate test methods and parameters to verify the performance of the selected insulators.

¹ At the time of writing these projects have yet to be initiated.

² References in square brackets refer to the bibliography.

2 Normative references

The following referenced documents are indispensable for the application 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 60038, *IEC standard voltages*

IEC 60050-471, *International Electrotechnical Vocabulary – Part 471:Insulators*

IEC 60305, *Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic or glass insulator units for a.c. systems – Characteristics of insulator units of the cap and pin type*

IEC 60433, *Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic insulators for a.c. systems – Characteristics of insulator units of the long rod type*

IEC 60507:1991, *Artificial pollution tests on high-voltage insulators to be used on a.c. systems*

IEC/TR 61245, *Artificial pollution tests on high-voltage insulators to be used on d.c. systems*