

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Insulators – Glossary of terms and definitions**

**Isolateurs – Lexique de termes et définitions**

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## INSULATORS – GLOSSARY OF TERMS AND DEFINITIONS

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International Standard IEC 62223 has been prepared by subcommittee 36: Insulators.

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

FDIS	Report on voting
36/287/FDIS	36/289/RVD

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

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## INSULATORS – GLOSSARY OF TERMS AND DEFINITIONS

### 1 Scope

This International Standard specifies terms defined in standards that fall under the scope of technical committee TC 36: Insulators. It covers terms that can be found in IEC 60050-471 as well as terms not appropriate for inclusion in IEC 60050-471 but used widely in the standards of IEC TC 36.

IEC 60050-471 is not intended to cover all the terms used in the various IEC standards but provides rather a general purpose vocabulary giving the basic terms and reference terms to be used by all technical committees. This glossary is intended to harmonize terms not listed in IEC 60050-471 but used in the publications of committee TC 36.

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

### 3 Terms and definitions

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

#### 3.1

##### **angular deviation of fixing holes**

rotational displacement, expressed as an angle, between corresponding fixing holes in the end fittings at the top and bottom of a hollow insulator or a post insulator

#### 3.2

##### **annealed glass**

glass which has been treated to eliminate internal stresses

[IEV 471-01-25]

#### 3.3

##### **antipollution-type insulator**

insulator which has the external profile designed for use in polluted areas

[IEV 471-01-23]

#### 3.4

##### **arcing distance**

shortest distance in air external to the insulator between the metallic parts which normally have the operating voltage between them

[IEV 471-01-01]

### 3.5

#### **ball and socket coupling**

coupling consisting of a ball, a socket and a locking device, and providing flexibility

[IEV 471-03-11]

### 3.6

#### **bushing**

device that enables one or several conductors to pass through a partition such as a wall or a tank, and insulate the conductors from it

NOTE 1 The means of attachment (flange or fixing device) to the partition forms part of the bushing. The conductor may form an integral part of the bushing or be drawn into the central tube of the bushing.

NOTE 2 The bushings may be of the following types:

- liquid-filled bushing;
- liquid-insulated bushing;
- gas-filled bushing;
- gas-insulated bushing;
- oil-impregnated paper bushing;
- resin-bonded paper bushing;
- resin-impregnated paper bushing;
- ceramic, glass or analogous inorganic material bushing;
- cast or moulded resin-insulated bushing;
- combined insulation bushing;
- compound-filled bushing;
- gas-impregnated bushing.

[IEV 471-02-01]

### 3.7

#### **camber** (of an insulator)

maximum distance between the theoretical axis of an insulator and the curved line being the locus of the centres of all the transverse cross-sections of the unloaded insulator

[IEV 471-01-26]

### 3.8

#### **cap and pin insulator**

insulator comprising an insulating part, usually having the form of a disk or bell, with or without ribs on its surface, and end fittings consisting of an outside cap and an inside pin attached axially

[IEV 471-03-07]

### 3.9

#### **capacitance graded bushing**

condenser bushing

bushing in which a desired voltage grading is obtained by an arrangement of conducting or semiconducting layers incorporated into the insulating material

[IEV 471-02-03]



**3.10****chalking**

flouring

appearance of some particles of the filler of the housing material forming a rough or powdery surface

**3.11****clevis**

female part of a clevis and tongue coupling with a U-shaped opening into which the tongue can be fitted

NOTE A clevis contains two holes through which the coupling pin may pass to couple the two components.

**3.12****clevis and tongue coupling**

coupling consisting of a clevis, a tongue and a coupling-pin, and providing limited flexibility

[IEV 471-03-01]

**3.13****completely immersed bushing**

bushing, both ends of which are intended to be immersed in insulating media other than ambient air (e.g. oil or gas)

[IEV 471-02-04]

**3.14****composite bushing**

bushing with an insulating envelope consisting of a resin-impregnated fibre tube with or without a rubber compound covering

**3.15****composite insulator**

insulator made of at least two insulating parts, namely a core and a housing equipped with metal fittings

NOTE Composite insulators, for example, can consist either of individual sheds mounted on the core, with or without an intermediate sheath, or alternatively, of a housing directly moulded or cast in one or several pieces onto the core.

[IEV 471-01-02]

**3.16****connection zone**

zone where the mechanical load is transmitted between the insulating body and the end fitting

**3.17****core diameter**

either the geometric diameter of a core of circular cross section or  $2\sqrt{A/\pi}$ , for a core with non-circular cross-section of area A

**3.18****core (of an insulator)**

central insulating part of an insulator, which provides the mechanical characteristics

NOTE The housing and sheds are not part of the core.

[IEV 471-01-03]

### 3.19

#### **coupling length**

distance between the end fittings

NOTE For post insulators the coupling length is the distance from flange face to flange face.

### 3.20

#### **coupling** (of an insulator)

part of the end fitting which transmits load to the hardware external to the insulator

### 3.21

#### **coupling pin**

rigid pin which passes through the holes in the clevis and tongue to couple them together

NOTE On one end, the coupling pin has a stud head and on the other a security device (e.g. split pin) is placed to hold the pin in its place

### 3.22

#### **crack**

any internal fracture or surface fissure of depth greater than 0,1 mm

### 3.23

#### **crazing**

surface micro-fractures of depths approximately 0,01 mm to 0,1 mm

### 3.24

#### **creepage distance**

shortest distance or the sum of the shortest distances along the surface on an insulator between two conductive parts which normally have the operating voltage between them

NOTE 1 The surface of cement or of any other non-insulating jointing material is not considered as forming part of the creepage distance.

NOTE 2 If a high-resistance coating is applied to parts of the insulating part of an insulator, such parts are considered to be effective insulating surfaces and the distance over them is included in the creepage distance.

[IEV 471-01-04]

### 3.25

#### **cylindrical post insulator**

post insulator of approximately cylindrical shape consisting of one or more insulating components with a metal fitting attached to each end; the metal fitting may consist of a cap, insert or flange with plain or tapped holes for attachment by bolts or screws

[IEV 471-04-06]

### 3.26

#### **deflection under bending load**

displacement of a point on an insulator, measured perpendicularly to its axis, under the effect of a load applied perpendicularly to this axis

[IEV 471-01-05]

### 3.27

#### **displacements**

#### 3.27.1

##### **axial displacement**

maximum positional variation, parallel to the insulator axis, of a definite point on the circumference of the considered insulator during one complete revolution about the insulator axis

**3.27.2****radial displacement**

maximum positional variation, perpendicular to the insulator axis, of a definite point on the circumference of the considered insulator during one complete revolution about the insulator axis

**3.27.3****angular displacement**

angular deviation about the insulator axis between corresponding planes of the two coupling pieces

**3.28****draw lead bushing**

bushing not having an integral current-carrying conductor; a cable or other conductor may be drawn through the bushing and attached to it at one end so that it may subsequently be detached to allow the bushing to be withdrawn

[IEV 471-02-11]

**3.29****dust deposit gauge index – non-soluble****DDGIN**

mass of non-soluble residue collected by a dust deposit gauge over a given period of time generally expressed in mg

**3.30****dust deposit gauge index – soluble****DDGIS**

volume conductivity, generally expressed in  $\mu\text{S}/\text{cm}$ , of the pollutants collected by a dust deposit gauge over a given period of time when dissolved in a standard quantity of demineralized water

**3.31****eccentricity**

displacement, perpendicular to the axis of the hollow insulator or post insulator, between the centres of the pitch circles of the fixing holes in the top and bottom metal fittings

**3.32****equivalent salt deposit density****ESDD**

amount of sodium chloride (NaCl) that, when dissolved in demineralized water, gives the same conductance as that of the natural deposit removed from a given surface of the insulator divided by the area of this surface; generally expressed in  $\text{mg}/\text{cm}^2$

**3.33****erosion**

irreversible and non-conducting degradation of the surface of the insulator that occurs by loss of material which can be uniform, localized or tree-shaped

NOTE Light surface traces, commonly tree-shaped, can occur on composite insulators as on ceramic insulators, after partial flashover. These traces are not considered to be objectionable as long as they are non-conductive. When they are conductive they are classified as tracking.

**3.34****end fitting**

integral component or formed part of an insulator, intended to connect it to a supporting structure, or to a conductor, or to an item of equipment, or to another insulator

NOTE Where the end fitting is metallic, the term "metal fitting" is normally used.

[IEV 471-01-06]

**3.35**

**flashover** (of an insulator)

disruptive discharge external to the insulator, and over its surface, connecting those parts which normally have the operating voltage between them

[IEV 471-01-07]

**3.36**

**glaze**

glassy surface layer on the insulating part of a ceramic insulator

[IEV 471-01-17]

**3.37**

**highest voltage for equipment**

$U_m$

highest r.m.s. value of line-to-line voltage for which the equipment is designed in respect of its insulation as well as other characteristics which relate to this voltage in the relevant equipment standards

[IEV 604-03-01]

**3.38**

**hollow insulator**

insulator which is open from end to end, with or without sheds, including end fittings

NOTE A hollow insulator can be made from one or more permanently assembled insulating elements.

[IEV 471-01-08]

**3.39**

**housing**

external insulating part of composite insulator providing necessary creepage distance and protects the core from the environment

NOTE An intermediate sheath made of insulating material may be part of the housing.

[IEV 471-01-09]

**3.40**

**indoor bushing**

bushing both ends of which are intended to be in ambient air at atmospheric pressure but not exposed to outdoor atmospheric conditions

[IEV 471-02-05]

**3.41**

**indoor-immersed bushing**

bushing, one end of which is intended to be in ambient air but not exposed to outdoor atmospheric conditions and the other end to be immersed in an insulating medium other than ambient air (e.g. oil or gas)

NOTE This definition includes bushings operating in air at temperatures above ambient, such as occur with air-insulated ducting.

[IEV 471-02-06]

**3.42****indoor post insulator**

post insulator not intended to be exposed to outdoor atmospheric conditions

[IEV 471-04-04]

**3.43****insulator**

device intended for electrical insulation and mechanical fixing of equipment or conductors which are subject to electric potential differences

[IEV 471-01-10]

**3.44****insulator set**

assembly of one or more insulator strings suitably connected together, complete with end fittings and protective devices as required in service

[IEV 471-03-02]

**3.45****insulator string**

one or more string insulator units coupled together and intended to give flexible support to conductors and stressed mainly in tension

[IEV 471-03-03]

**3.46****insulator trunk**

central insulating part of an insulator from which the sheds project

NOTE Also known as shank on smaller insulators.

[IEV 471-01-11]

**3.47****interface**

surface between different materials

NOTE Various interfaces occur in most composite insulators, e.g.

- between housing and end fittings,
- between various parts of the housing; e.g. between sheds, or between sheath and sheds,
- between core and housing.

**3.48****leakage current (of an insulator)**

electric current in an unwanted conductive path other than a short circuit

**3.49****line-post insulator**

rigid insulator intended to be subjected to cantilever, tensile and compressive loads, constructed with one or more insulating materials and assembled on a metal base that is intended to be mounted rigidly on a supporting structure

[IEV 471-03-04]