IEC 60305

Edition 5.0 2021-01
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Insulators for overhead lines with a nominal voltage above 1 000 V – Ceramic or glass insulator units for AC systems – Characteristics of insulator units of the cap and pin type

IEC 60305:2021-01 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

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

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INSULATORS FOR OVERHEAD LINES WITH A NOMINAL VOLTAGE ABOVE 1 000 V – CERAMIC OR GLASS INSULATOR UNITS FOR AC SYSTEMS – CHARACTERISTICS OF INSULATOR UNITS OF THE CAP AND PIN TYPE

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60305:1995. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60305 has been prepared by IEC technical committee 36: Insulators.

This fifth edition cancels and replaces the fourth edition published in 1995. This edition constitutes a technical revision.

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

a) wording in Scope changed from "it is recommended" to "it is applicable";
b) new normative references added;
c) electromechanical or mechanical failing load in Clause 4 specified;
d) new figures added showing profiles;
e) Tables 1, 2, 3, 4 and 5 expanded to include more specified values.

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

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INSULATORS FOR OVERHEAD LINES WITH A NOMINAL VOLTAGE ABOVE 1 000 V – CERAMIC OR GLASS INSULATOR UNITS FOR AC SYSTEMS – CHARACTERISTICS OF INSULATOR UNITS OF THE CAP AND PIN TYPE

1 Scope ~~and object~~

This International Standard applies to string insulator units of the cap and pin type with insulating parts of ceramic material or glass, intended for AC overhead lines with a nominal voltage greater than 1 000 V and a frequency not greater than 100 Hz. It also applies to insulators of similar design used in substations.

This document applies to string insulator units of the cap and pin type either with ball and socket couplings or with clevis and tongue couplings.

This document applies to string insulator units for use on overhead lines in clean areas and polluted areas. For use in areas characterized by very heavy pollution levels and for other particular or extreme environmental conditions, it may be necessary for certain dimensions to be changed and insulator units having different creepage distances, spacing and forms may be preferred (for example, flat profile, hemispherical etc.). Insulators for use on DC systems may also need different dimensions. In any case, it is ~~recommended~~ applicable that the standardized mechanical characteristics of this document and coupling sizes are retained.

The object of this document is to prescribe specified values for the mechanical characteristics and for the main dimensions of string insulator units of the cap and pin type.

The power frequency, lightning impulse and puncture withstand voltages of string insulator units are not specified in this document. IEC 60383-1 gives the electrical characteristics which define string insulator units; their values ~~shall be~~ are agreed between purchaser and manufacturer.

Ball and socket couplings are covered by IEC 60120, clevis and tongue couplings by IEC 60471.

NOTE ~~For the definition of pollution levels see IEC 815.~~ For the definition of site pollution severity see IEC TS 60815-1.

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 60383-1~~: 1993~~, *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 471: 1977, *Dimensions of clevis and tongue couplings of string insulator units*~~

~~IEC 815: 1986, *Guide for the selection of insulators in respect of polluted conditions*~~

3 Terms and definitions

No terms and definitions are listed in this document.

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

- IEC Electropedia: available at http://www.electropedia.org/
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4 Mechanical ~~and dimensional~~ characteristics, dimensions and types

String insulator units of the cap and pin type are standardized by the following specified characteristics:

– Specified electromechanical or mechanical failing load (SFL) according to IEC 60383-1;
– maximum nominal diameter of the insulating part;
– nominal spacing;
– minimum nominal creepage distance;
– standard coupling.

The corresponding values are indicated in Table 1, Table 2, Table 3, Table 4 and Table 5.

NOTE 1 The following points merit attention for insulators for use in polluted areas:

a) even if the creepage distance is the same, the withstand voltage characteristics may change with shed shape of the insulators;

b) even if the string length is the same, the withstand voltage characteristics may decrease with increasing insulator strength due to the lower efficiency of creepage distance for a larger average diameter.

NOTE 2 IEC 60815 gives details on the important parameters of shed profiles for antipollution insulators.

5 Designation and marking with respect to shed profile

Insulators are designated in Table 1, Table 2, Table 3, Table 4 and Table 5 by the letter U followed by a number indicating the specified electromechanical or mechanical failing load in kilonewtons.

The letter B or C which follows specifies a ball and socket or clevis and tongue, respectively.

The following letter S or L, if present, specifies a short or long spacing.

~~Long creepage distance insulators for polluted areas are designated by a final letter P.~~

The letter P, D, V, or T present for "anti-fog" profile, "aerodynamic" profile, "two-alternating" profile, or "three-alternating" profile, as shown in Figure 1, Figure 2, Figure 3,Figure 4 and Figure 5, respectively.

IEC 60383-1 specifies that insulators shall be marked with the specified electromechanical or mechanical failing load. This load may be indicated by using the first part of the designation given in the first column of Table 1, Table 2, Table 3, Table 4 and Table 5: For instance, the insulator may be marked U 160 for the units U 160 BS, U 160 BL and U 160 BLP.

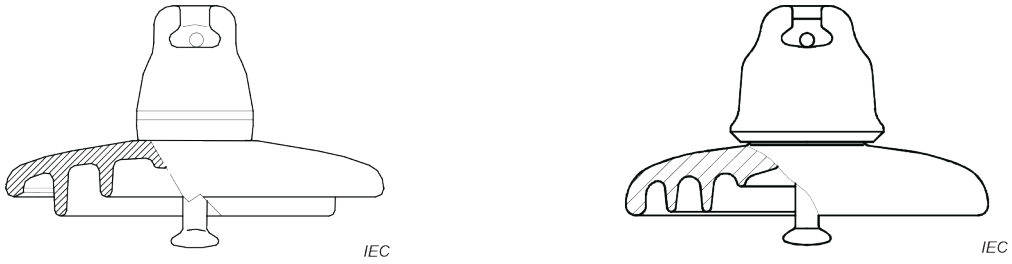


Figure 1 – Typical "standard" profile

Figure 2 – Typical "anti-fog" profile "P"

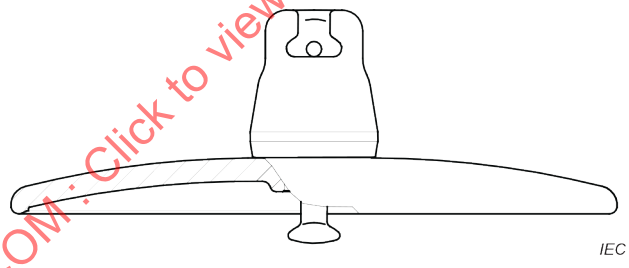


Figure 3 – Typical "aerodynamic" profile "D"

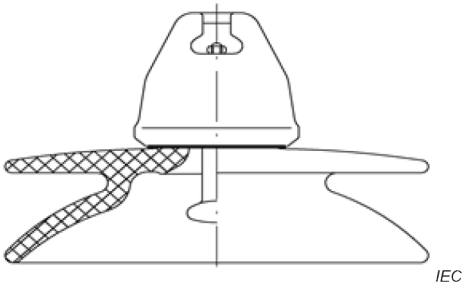


Figure 4 – Typical "two-alternating" profile "V"

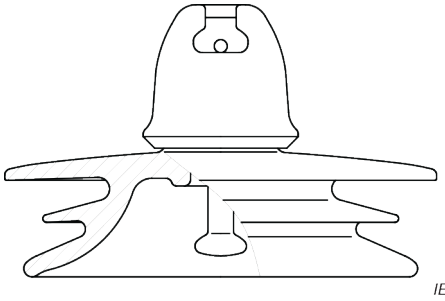


Figure 5 – Typical "three-alternating" profile "T"

6 Tolerances

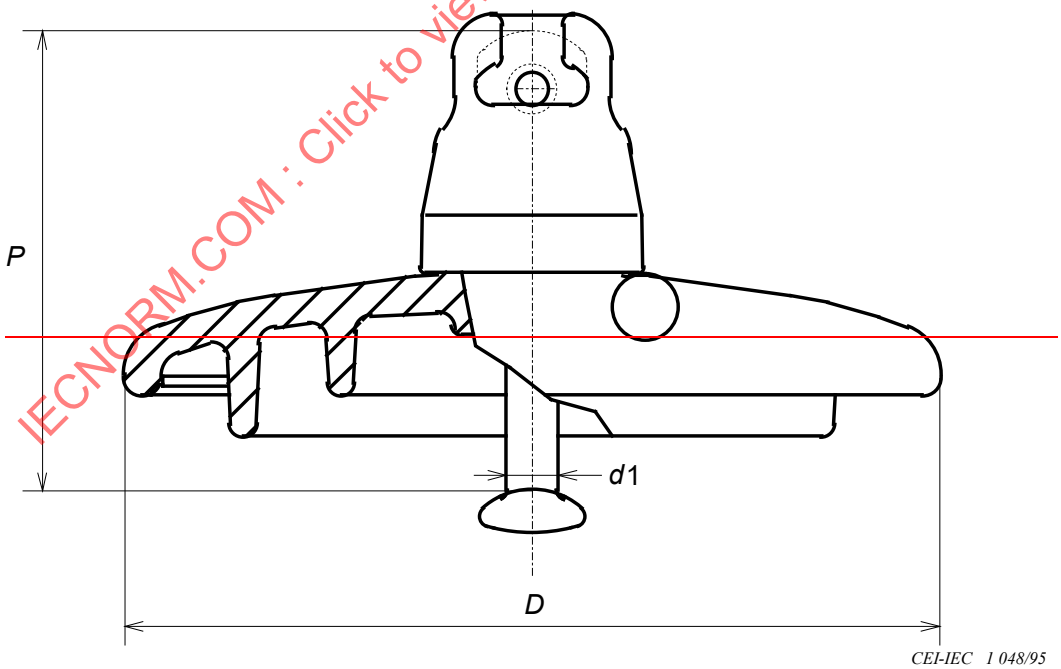
Except for nominal spacing, tolerances for dimensions indicated in IEC 60383-1 are applicable to all nominal values including maximum nominal diameter and minimum nominal creepage distance values given in Table 1, Table 2, Table 3, Table 4 and Table 5.

Diagram of Table 1, Table 2, Table 3, Table 4 and Table 5 is shown in Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10, respectively.

Nominal spacing tolerance shall be:

± (0,03 P + 0,3) mm

P being spacing expressed in millimetres.



~~**Figure 1 – String insulator unit with ball and socket coupling**~~

Table 1 – Specified values of mechanical and dimensional characteristics for string insulator units with ball and socket couplings

Designation	Electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 120 d1
U 40 B	40	175	110	190	11
U 40 BP	40	210	110	295	11
U 70 BS	70	255	127	295	16
U 70 BL	70	255	146	295	16
U 70 BLP	70	280	146	440	16
U 100 BS	100	255	127	295	16
U 100 BL	100	255	146	295	16
U 100 BLP	100	280	146	440	16
U 120 B	120	255	146	295	16
U 120 BP	120	280	146	440	16
U 160 BS	160	280	146	315	20
U 160 BSP	160	330	146	440	20
U 160 BL	160	280	170	340	20
U 160 BLP	160	330	170	525	20
U 210 B	210	300	170	370	20
U 210 BP	210	330	170	525	20
U 300 B	300	330	195	390	24
U 300 BP	300	400	195	590	24
U 400 B	400	380	205	525	28
U 530 B	530	380	240	600	32

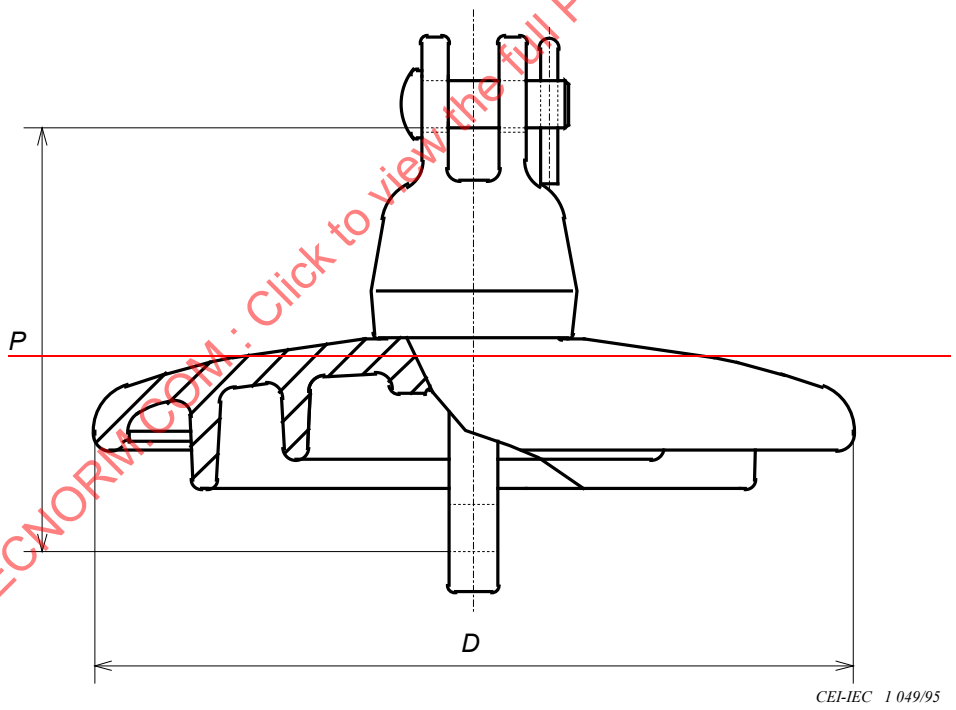


Figure 2 – String insulator unit with clevis and tongue couplings

Table 2 – Specified values of mechanical and dimensional characteristics for string insulator units with clevis and tongue couplings

Designation	Electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 471
U 70 C	70	255	146	295	16 C
U 70 CP	70	280	146	440	16 C
U 100 C	100	255	146	295	16 C
U 100 CP	100	280	146	440	16 C
U 120 C	120	255	146	295	16 C
U 120 CP	120	280	146	440	16 C
U 160 C	160	280	170	340	19 C
U 160 CP	160	330	170	525	19 C
U 210 C	210	300	178	370	22 C
U 210 CP	210	330	178	525	22 C
NOTE – Insulators having an electromechanical or mechanical failing load exceeding 210 kN are not specified. If necessary, the insulators with ball and socket coupling defined in table 1 shall preferably be used.					

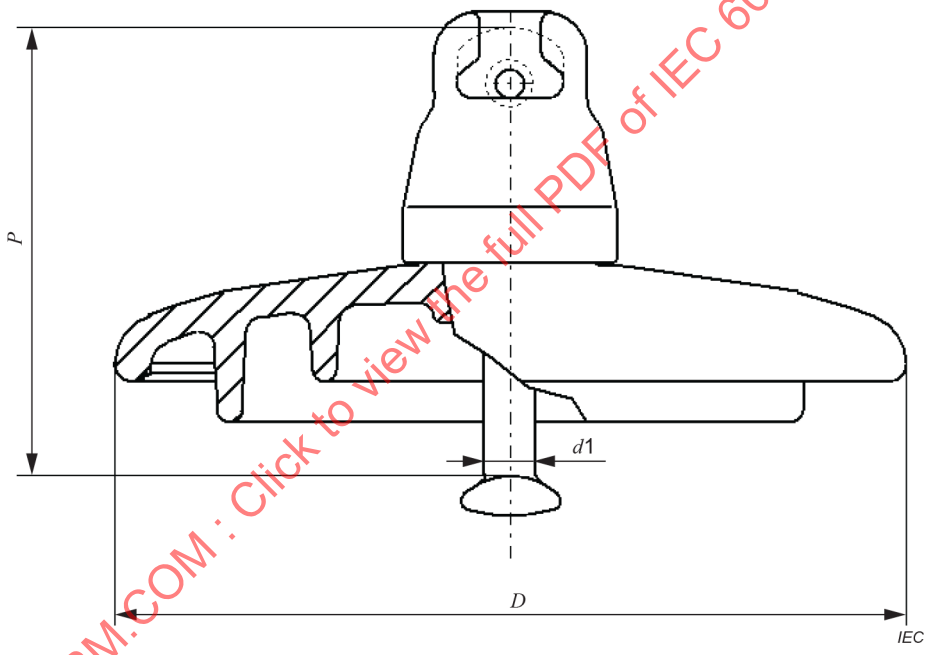


Figure 6 – String insulator unit of standard and anti-fog profile with ball and socket coupling

Table 1 – Specified values of mechanical and dimensional characteristics for string insulator units of standard and anti-fog profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120 d1
U 40 B	40	175	110	190	11
U 40 BP	40	210	110	295	11
U 70 BS	70	255	127	295	16
U 70 BL	70	255	146	295	16
U 70 BLP	70	280	146	440	16
U 100 BS	100	255	127	295	16
U 100 BL	100	255	146	295	16
U 100 BLP	100	280	146	440	16
U 120 B	120	255	146	295	16
U 120 BP	120	280	146	440	16
U 160 BS	160	280	146	315	20
U 160 BSP	160	330	146	440	20
U 160 BL	160	280	170	340	20
U 160 BLP	160	330	170	525	20
U 210 B	210	300	170	370	20
U 210 BP	210	330	170	525	20
U 300 B	300	330	195	390	24
U 300 BP	300	400	195	590	24
U 400 B	400	380	205	525	28
U 420 B	420	380	205	525	28
U 530 B	530	380	240	600	32
U 550 B	550	380	240	600	32
U 700 B	700	430	280	600	36
U 840 B	840	430	300	600	40

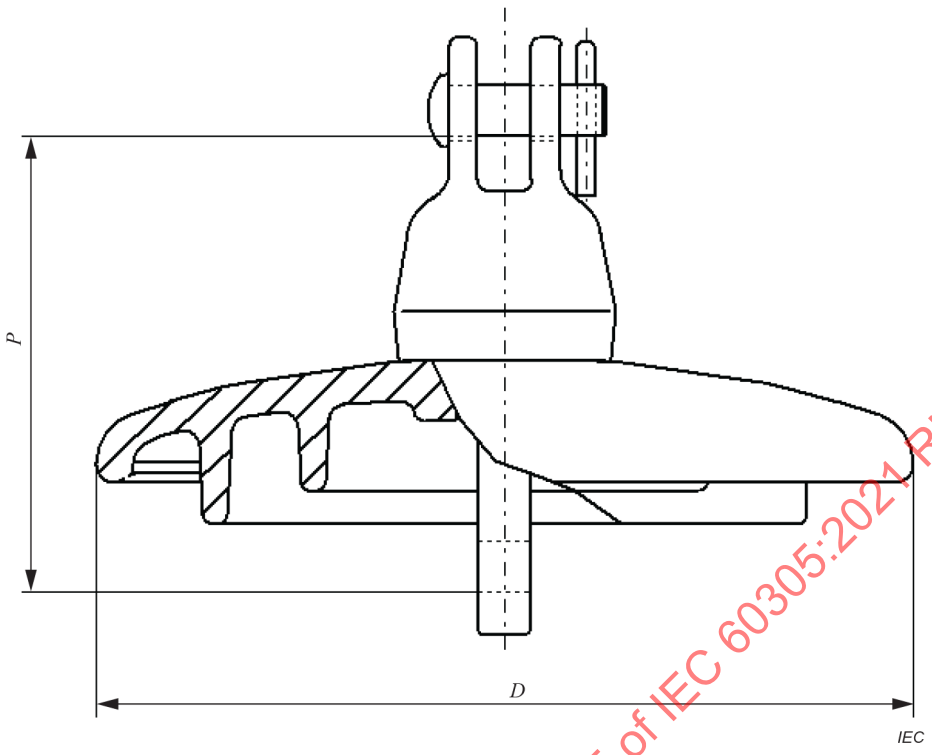


Figure 7 – String insulator unit of standard and anti-fog profile with clevis and tongue coupling

Table 2 – Specified values of mechanical and dimensional characteristics for string insulator units of standard and anti-fog profile with clevis and tongue couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60471
U 40 C	40	190	140	200	16 C
U 70 C	70	255	146	295	16 C
U 70 CP	70	280	146	440	16 C
U 100 C	100	255	146	295	16 C
U 100 CP	100	280	146	440	16 C
U 120 C	120	255	146	295	16 C
U 120 CP	120	280	146	440	16 C
U 160 C	160	280	170	340	19 C
U 160 CP	160	330	170	525	19 C
U 210 C	210	300	178	370	22 C
U 210 CP	210	330	178	525	22 C

NOTE Insulators having an electromechanical or mechanical failing load exceeding 210 kN are not specified. If necessary, the insulators with ball and socket coupling defined in Table 1 shall preferably be used.

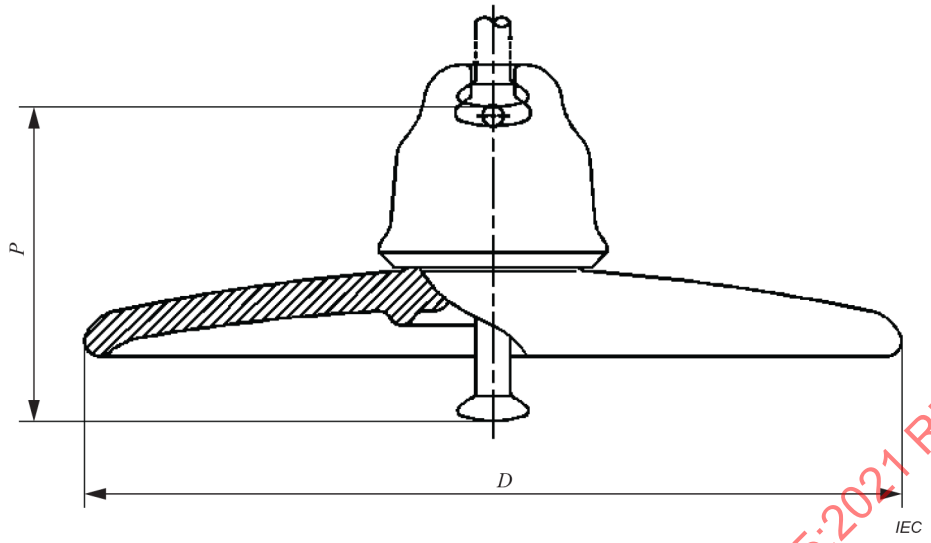


Figure 8 – String insulator unit of aerodynamic profile with ball and socket coupling

Table 3 – Specified values of mechanical and dimensional characteristics for string insulator units of aerodynamic profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BSD	70	380	127	305	16
U 70 BLD	70	380	146	305	16
U 120 BSD	120	380	127	295	16
U 120 BLD	120	380	146	295	16
U 160 BD	160	425	146	375	20
U 210 BD	210	425	170	375	20

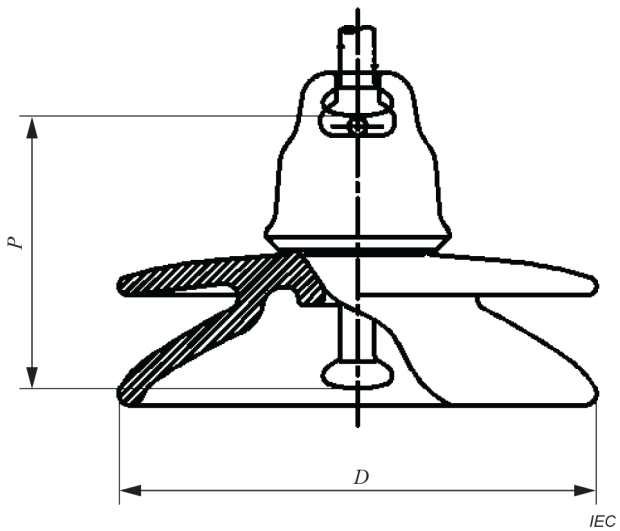


Figure 9 – String insulator unit of two-alternating profile with ball and socket coupling

Table 4 – Specified values of mechanical and dimensional characteristics for string insulator units of two-alternating profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BSV	70	280	146	450	16
U 70 BLV	70	280	160	450	16
U 120 BSV	120	280	146	450	16
U 120 BLV	120	280	160	450	16
U 160 BSV	160	290	155	450	20
U 160 BV	160	290	160	450	20
U 160 BLV	160	355	170	450	20
U 210 BV	210	355	170	450	20
U 240 BV	240	300	170	450	24
U 300 BV	300	360	195	485	24
U 400 BV	400	400	205	555	28
U 420 BV	420	400	205	555	28
U 530 BV	530	420	240	600	32
U 550 BV	550	420	240	600	32

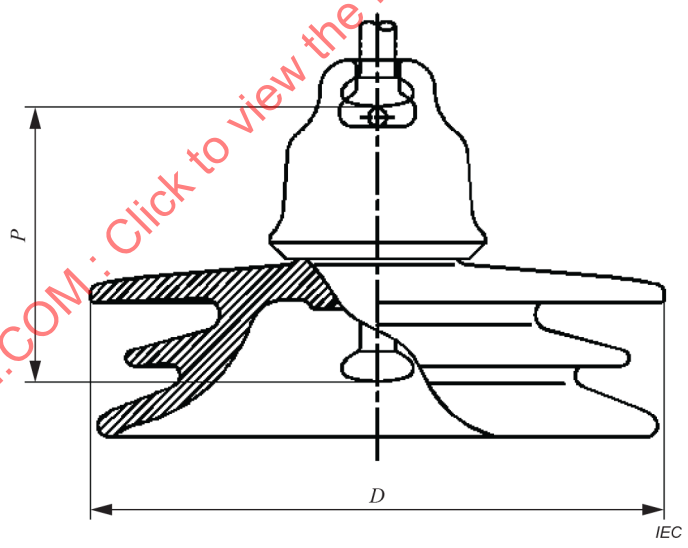


Figure 10 – String insulator unit of three-alternating profile with ball and socket coupling

Table 5 – Specified values of mechanical and dimensional characteristics for string insulator units of three-alternating profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BT	70	320	155	550	16
U 120 BT	120	320	155	550	16
U 160 BST	160	325	155	545	20
U 160 BT	160	325	160	545	20
U 160 BLT	160	325	170	545	20
U 210 BT	210	325	170	545	20
U 240 BT	240	325	170	545	24
U 300 BT	300	400	195	550	24
U 400 BT	400	400	205	635	28
U 420 BT	420	400	205	635	28
U 530 BT	530	400	240	635	32
U 550 BT	550	400	240	635	32

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[1] IEC 60120:2020, *Ball and socket couplings of string insulator units – Dimensions*

[2] IEC 60471:2020, *Clevis and tongue couplings of string insulator units – Dimensions*

[3] 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*

[4] IEC TS 60815-2:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for AC systems*

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INTERNATIONAL STANDARD

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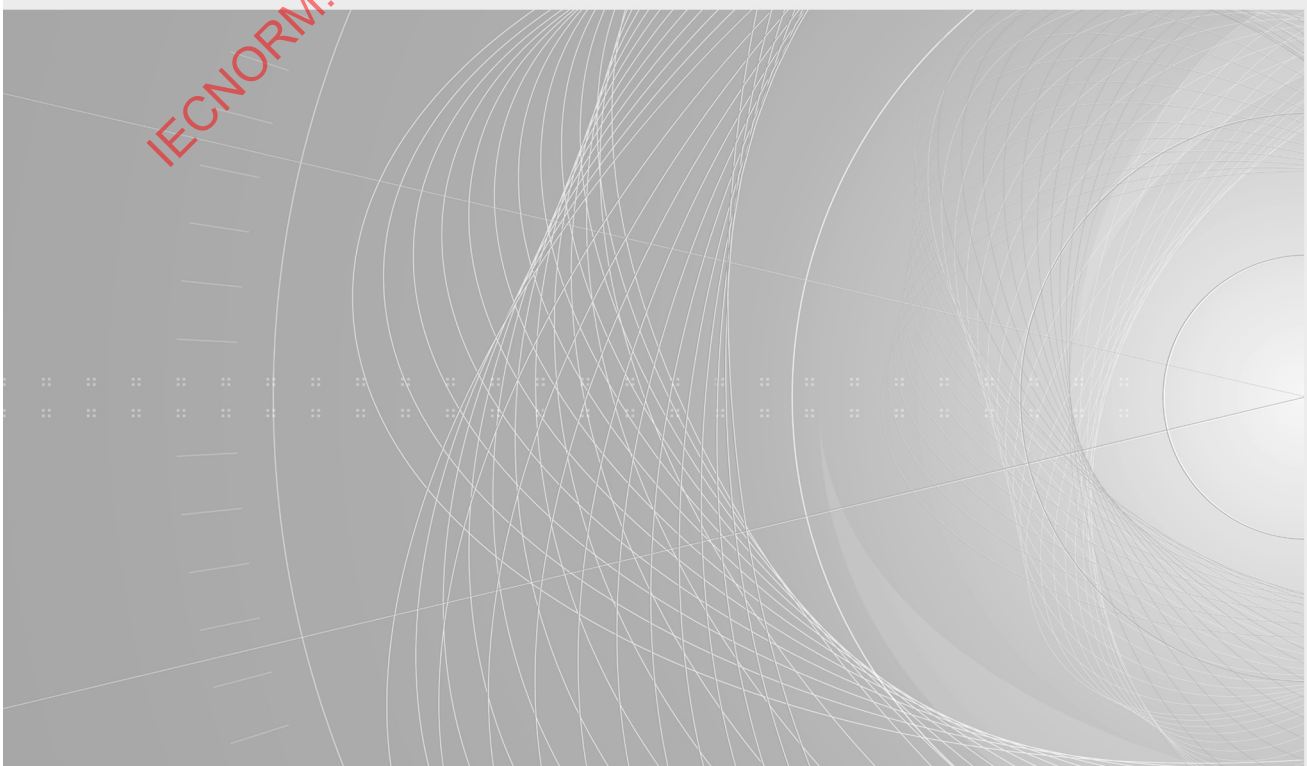
Isolateurs pour lignes aériennes de tension nominale supérieure a 1 000 V – Éléments d'isolateurs en céramique ou en verre pour réseaux à tension alternative – Caractéristiques des éléments d'isolateurs du type capot et tige



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INSULATORS FOR OVERHEAD LINES WITH A NOMINAL VOLTAGE ABOVE 1 000 V – CERAMIC OR GLASS INSULATOR UNITS FOR AC SYSTEMS – CHARACTERISTICS OF INSULATOR UNITS OF THE CAP AND PIN TYPE

1 Scope

This International Standard applies to string insulator units of the cap and pin type with insulating parts of ceramic material or glass, intended for AC overhead lines with a nominal voltage greater than 1 000 V and a frequency not greater than 100 Hz. It also applies to insulators of similar design used in substations.

This document applies to string insulator units of the cap and pin type either with ball and socket couplings or with clevis and tongue couplings.

This document applies to string insulator units for use on overhead lines in clean areas and polluted areas. For use in areas characterized by very heavy pollution levels and for other particular or extreme environmental conditions, it may be necessary for certain dimensions to be changed and insulator units having different creepage distances, spacing and forms may be preferred (for example, flat profile, hemispherical etc.). Insulators for use on DC systems may also need different dimensions. In any case, it is applicable that the standardized mechanical characteristics of this document and coupling sizes are retained.

The object of this document is to prescribe specified values for the mechanical characteristics and for the main dimensions of string insulator units of the cap and pin type.

The power frequency, lightning impulse and puncture withstand voltages of string insulator units are not specified in this document. IEC 60383-1 gives the electrical characteristics which define string insulator units; their values are agreed between purchaser and manufacturer.

Ball and socket couplings are covered by IEC 60120, clevis and tongue couplings by IEC 60471.

NOTE For the definition of site pollution severity see IEC TS 60815-1.

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 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*

3 Terms and definitions

No terms and definitions are listed in this document.

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

4 Mechanical characteristics, dimensions and types

String insulator units of the cap and pin type are standardized by the following specified characteristics:

– Specified electromechanical or mechanical failing load (SFL) according to IEC 60383-1;
– maximum nominal diameter of the insulating part;
– nominal spacing;
– minimum nominal creepage distance;
– standard coupling.

The corresponding values are indicated in Table 1, Table 2, Table 3, Table 4 and Table 5.

NOTE 1 The following points merit attention for insulators for use in polluted areas:

a) even if the creepage distance is the same, the withstand voltage characteristics may change with shed shape of the insulators;

b) even if the string length is the same, the withstand voltage characteristics may decrease with increasing insulator strength due to the lower efficiency of creepage distance for a larger average diameter.

NOTE 2 IEC 60815 gives details on the important parameters of shed profiles for antipollution insulators.

5 Designation and marking with respect to shed profile

Insulators are designated in Table 1, Table 2, Table 3, Table 4 and Table 5 by the letter U followed by a number indicating the specified electromechanical or mechanical failing load in kilonewtons.

The letter B or C which follows specifies a ball and socket or clevis and tongue, respectively.

The following letter S or L, if present, specifies a short or long spacing.

The letter P, D, V, or T present for "anti-fog" profile, "aerodynamic" profile, "two-alternating" profile, or "three-alternating" profile, as shown in Figure 1, Figure 2, Figure 3,Figure 4 and Figure 5, respectively.

IEC 60383-1 specifies that insulators shall be marked with the specified electromechanical or mechanical failing load. This load may be indicated by using the first part of the designation given in the first column of Table 1, Table 2, Table 3, Table 4 and Table 5: For instance, the insulator may be marked U 160 for the units U 160 BS, U 160 BL and U 160 BLP.

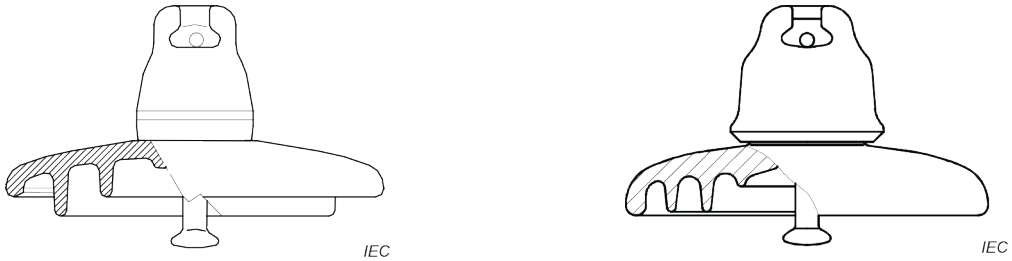

Figure 1 – Typical "standard" profile

Figure 2 – Typical "anti-fog" profile "P"

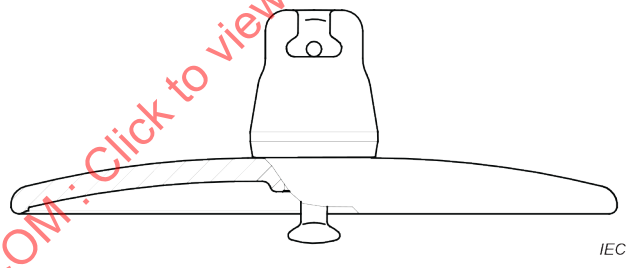

Figure 3 – Typical "aerodynamic" profile "D"

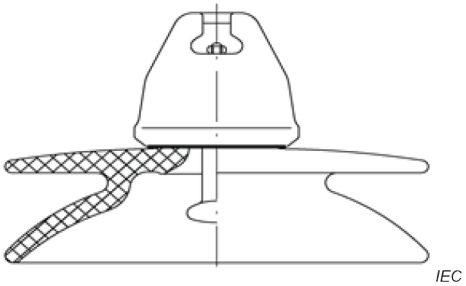

Figure 4 – Typical "two-alternating" profile "V"

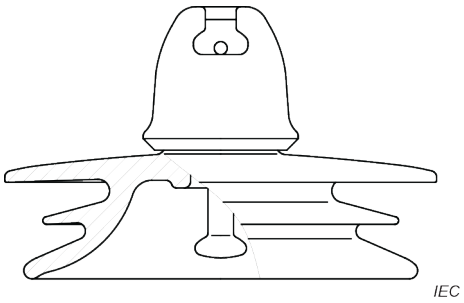

Figure 5 – Typical "three-alternating" profile "T"

6 Tolerances

Except for nominal spacing, tolerances for dimensions indicated in IEC 60383-1 are applicable to all nominal values including maximum nominal diameter and minimum nominal creepage distance values given in Table 1, Table 2, Table 3, Table 4 and Table 5.

Diagram of Table 1, Table 2, Table 3, Table 4 and Table 5 is shown in Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10, respectively.

Nominal spacing tolerance shall be:

± (0,03 P + 0,3) mm

P being spacing expressed in millimetres.

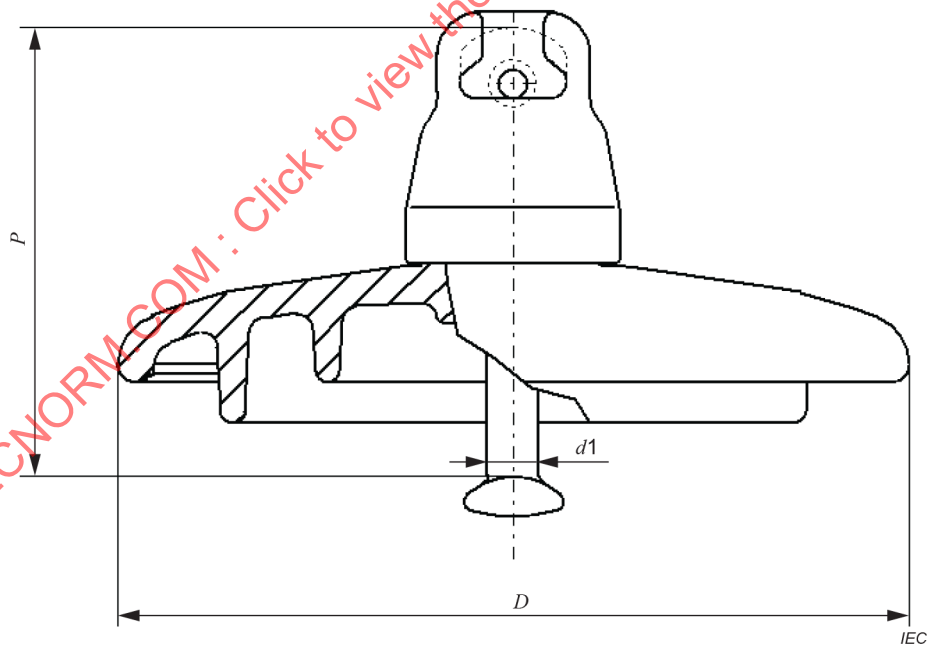

Figure 6 – String insulator unit of standard and anti-fog profile with ball and socket coupling

Table 1 – Specified values of mechanical and dimensional characteristics for string insulator units of standard and anti-fog profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120 d1
U 40 B	40	175	110	190	11
U 40 BP	40	210	110	295	11
U 70 BS	70	255	127	295	16
U 70 BL	70	255	146	295	16
U 70 BLP	70	280	146	440	16
U 100 BS	100	255	127	295	16
U 100 BL	100	255	146	295	16
U 100 BLP	100	280	146	440	16
U 120 B	120	255	146	295	16
U 120 BP	120	280	146	440	16
U 160 BS	160	280	146	315	20
U 160 BSP	160	330	146	440	20
U 160 BL	160	280	170	340	20
U 160 BLP	160	330	170	525	20
U 210 B	210	300	170	370	20
U 210 BP	210	330	170	525	20
U 300 B	300	330	195	390	24
U 300 BP	300	400	195	590	24
U 400 B	400	380	205	525	28
U 420 B	420	380	205	525	28
U 530 B	530	380	240	600	32
U 550 B	550	380	240	600	32
U 700 B	700	430	280	600	36
U 840 B	840	430	300	600	40

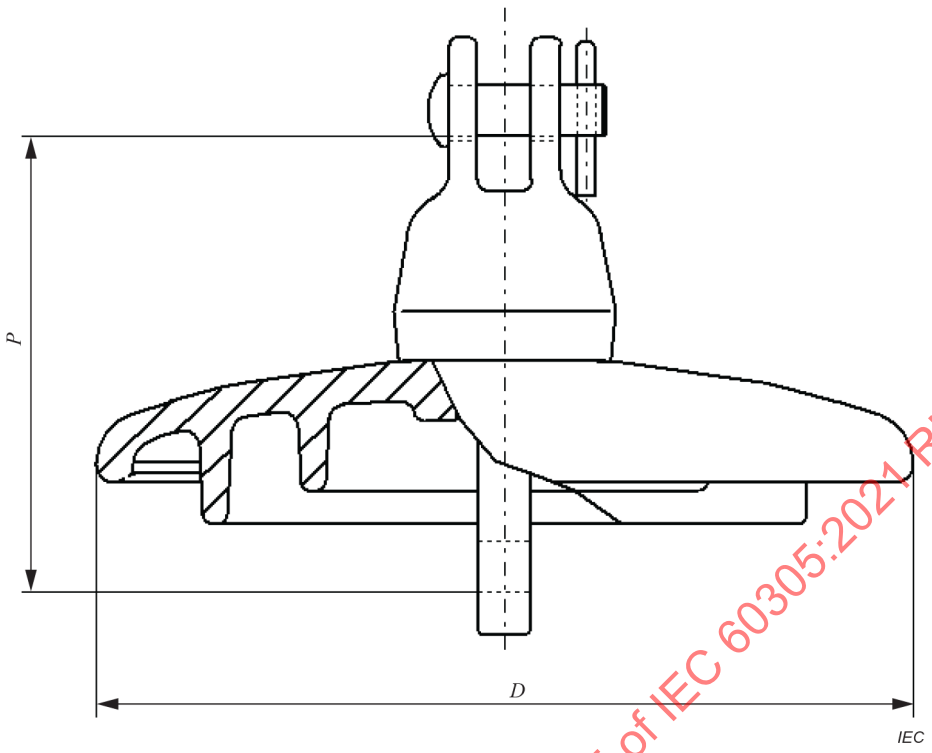

Figure 7 – String insulator unit of standard and anti-fog profile with clevis and tongue coupling

Table 2 – Specified values of mechanical and dimensional characteristics for string insulator units of standard and anti-fog profile with clevis and tongue couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60471
U 40 C	40	190	140	200	16 C
U 70 C	70	255	146	295	16 C
U 70 CP	70	280	146	440	16 C
U 100 C	100	255	146	295	16 C
U 100 CP	100	280	146	440	16 C
U 120 C	120	255	146	295	16 C
U 120 CP	120	280	146	440	16 C
U 160 C	160	280	170	340	19 C
U 160 CP	160	330	170	525	19 C
U 210 C	210	300	178	370	22 C
U 210 CP	210	330	178	525	22 C
NOTE Insulators having an electromechanical or mechanical failing load exceeding 210 kN are not specified. If necessary, the insulators with ball and socket coupling defined in Table 1 shall preferably be used.					

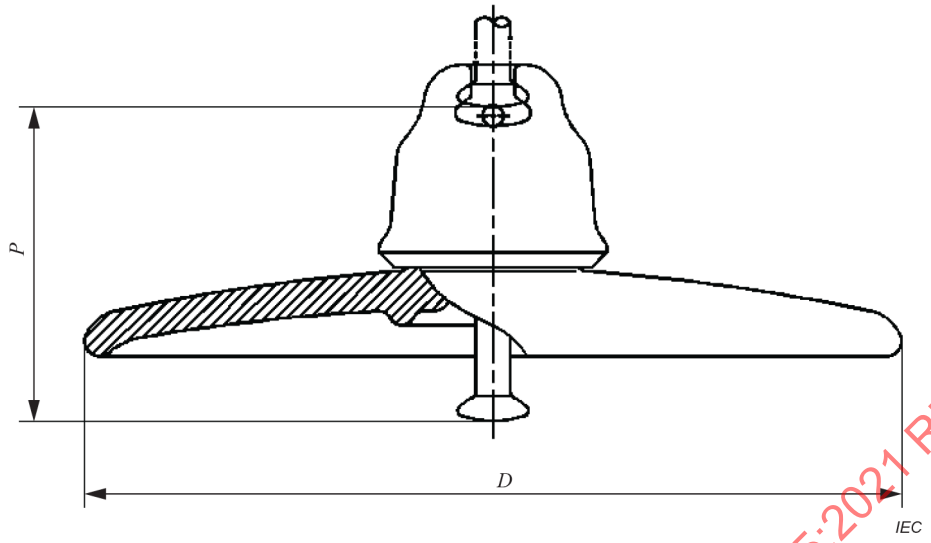

Figure 8 – String insulator unit of aerodynamic profile with ball and socket coupling

Table 3 – Specified values of mechanical and dimensional characteristics for string insulator units of aerodynamic profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BSD	70	380	127	305	16
U 70 BLD	70	380	146	305	16
U 120 BSD	120	380	127	295	16
U 120 BLD	120	380	146	295	16
U 160 BD	160	425	146	375	20
U 210 BD	210	425	170	375	20

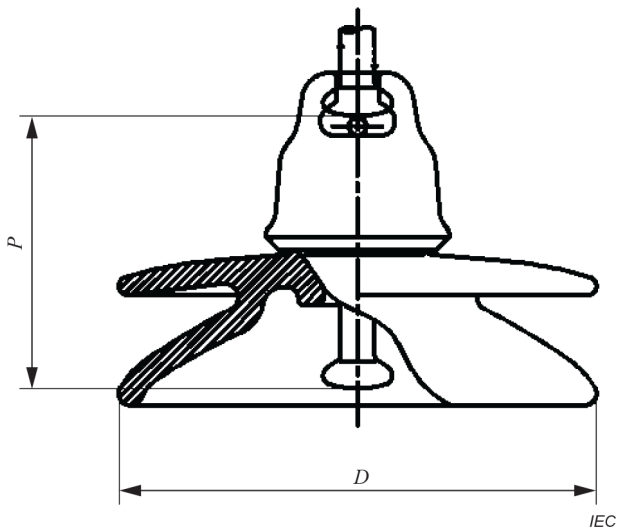

Figure 9 – String insulator unit of two-alternating profile with ball and socket coupling

Table 4 – Specified values of mechanical and dimensional characteristics for string insulator units of two-alternating profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BSV	70	280	146	450	16
U 70 BLV	70	280	160	450	16
U 120 BSV	120	280	146	450	16
U 120 BLV	120	280	160	450	16
U 160 BSV	160	290	155	450	20
U 160 BV	160	290	160	450	20
U 160 BLV	160	355	170	450	20
U 210 BV	210	355	170	450	20
U 240 BV	240	300	170	450	24
U 300 BV	300	360	195	485	24
U 400 BV	400	400	205	555	28
U 420 BV	420	400	205	555	28
U 530 BV	530	420	240	600	32
U 550 BV	550	420	240	600	32

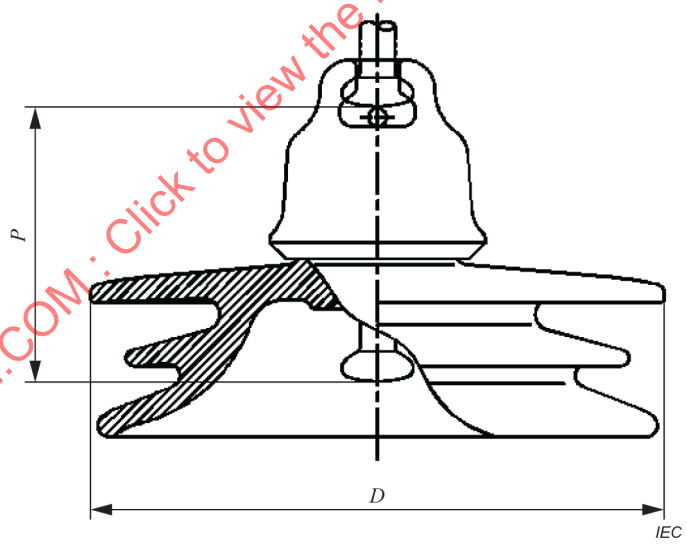

Figure 10 – String insulator unit of three-alternating profile with ball and socket coupling

Table 5 – Specified values of mechanical and dimensional characteristics for string insulator units of three-alternating profile with ball and socket couplings

Designation	Specified electromechanical or mechanical failing load kN	Maximum nominal diameter of the insulating part D mm	Nominal spacing P mm	Minimum nominal creepage distance mm	Standard coupling according to IEC 60120
U 70 BT	70	320	155	550	16
U 120 BT	120	320	155	550	16
U 160 BST	160	325	155	545	20
U 160 BT	160	325	160	545	20
U 160 BLT	160	325	170	545	20
U 210 BT	210	325	170	545	20
U 240 BT	240	325	170	545	24
U 300 BT	300	400	195	550	24
U 400 BT	400	400	205	635	28
U 420 BT	420	400	205	635	28
U 530 BT	530	400	240	635	32
U 550 BT	550	400	240	635	32

Bibliography

[1] IEC 60120:2020, *Ball and socket couplings of string insulator units – Dimensions*

[2] IEC 60471:2020, *Clevis and tongue couplings of string insulator units – Dimensions*

[3] 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*

[4] IEC TS 60815-2:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for AC systems*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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ISOLATEURS POUR LIGNES AÉRIENNES DE TENSION NOMINALE SUPÉRIEURE A 1 000 V – ÉLÉMENTS D'ISOLATEURS EN CÉRAMIQUE OU EN VERRE POUR RÉSEAUX À TENSION ALTERNATIVE – CARACTÉRISTIQUES DES ÉLÉMENTS D'ISOLATEURS DU TYPE CAPOT ET TIGE

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La Norme internationale IEC 60305 a été établie par le comité d'études 36 de l'IEC: Isolateurs.

Cette cinquième édition annule et remplace la quatrième édition parue en 1995. Cette édition constitue une révision technique.

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

a) reformulation du domaine d'application: "il est recommandé d'utiliser" a été remplacé par "il est possible de retenir";
b) ajout de nouvelles références normatives;
c) spécification à l'Article 4 de la charge de rupture électromécanique ou mécanique;
d) ajout de nouvelles figures représentant des profils;
e) Les Tableaux 1, 2, 3, 4 et 5 ont été étoffés pour intégrer un plus grand nombre de valeurs spécifiées.

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

FDIS	Rapport de vote
36/499/FDIS	36/501/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

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ISOLATEURS POUR LIGNES AÉRIENNES DE TENSION NOMINALE SUPÉRIEURE A 1 000 V – ÉLÉMENTS D'ISOLATEURS EN CÉRAMIQUE OU EN VERRE POUR RÉSEAUX À TENSION ALTERNATIVE – CARACTÉRISTIQUES DES ÉLÉMENTS D'ISOLATEURS DU TYPE CAPOT ET TIGE

1 Domaine d'application

La présente Norme internationale s'applique aux éléments de chaînes d'isolateurs du type à capot et tige ayant des parties isolantes en matière céramique ou en verre et destinés aux lignes aériennes fonctionnant en courant alternatif à une tension nominale supérieure à 1 000 V et à une fréquence au plus égale à 100 Hz. Elle s'applique également aux isolateurs du même type utilisés dans les postes.

Le présent document s'applique aux éléments de chaînes d'isolateurs du type à capot et tige soit avec assemblage à rotule, soit avec assemblage à chape et tenon.

Le présent document s'applique aux éléments de chaînes d'isolateurs destinés aux lignes aériennes situées dans des régions polluées et non polluées. Pour les isolateurs destinés à être utilisés dans des régions très fortement polluées et dans d'autres conditions environnementales particulières ou extrêmes, il peut être nécessaire de modifier certaines dimensions et il peut être préférable d'utiliser des éléments d'isolateurs ayant des lignes de fuite, des pas et des formes différentes (par exemple, profil plat, hémisphérique, etc.). Les isolateurs destinés à être utilisés sur les réseaux à tension continue peuvent également nécessiter des dimensions différentes. Dans tous les cas, il est possible de retenir les caractéristiques mécaniques normalisées du présent document et les dimensions d'assemblage.

Le présent document a pour objet de prescrire des valeurs spécifiées pour les caractéristiques mécaniques et pour les principales dimensions des éléments de chaînes d'isolateurs du type à capot et tige.

Les tensions de tenue à fréquence industrielle, aux chocs de foudre et de perforation des éléments de chaînes d'isolateurs ne sont pas spécifiées dans le présent document. l'IEC 60383–1 donne les caractéristiques électriques qui définissent les éléments de chaînes d'isolateurs; ces caractéristiques doivent être fixées d'un commun accord entre l'acheteur et le fabricant.

Les assemblages à rotule sont couverts par l'IEC 60120, et les assemblages à chape et tenon par l'IEC 60471.

NOTE Pour la définition des niveaux de pollution des sites, voir l'IEC TS 60815-1.

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 60383-1, *Isolateurs pour lignes aériennes de tension nominale supérieure à 1000 V – Partie 1: Eléments d'isolateurs en matière céramique ou en verre pour systèmes à courant alternatif - Définitions, méthodes d'essai et critères d'acceptation*

3 Termes et définitions

Aucun terme n'est défini dans le présent document.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

4 Caractéristiques mécaniques, dimensions et types

Les éléments de chaînes d'isolateurs du type à capot et tige sont normalisés selon les caractéristiques spécifiées suivantes:

– charge de rupture électromécanique ou mécanique spécifiée (SFL, Specified electromechanical or mechanical failing load) selon l'IEC 60383-1;

– diamètre nominal maximal de la partie isolante;

– pas nominal;

– ligne de fuite nominale minimale;

– norme d'assemblage.

Les valeurs correspondantes sont indiquées dans le Tableau 1, le Tableau 2, le Tableau 3, le Tableau 4 et le Tableau 5.

NOTE 1 Pour les isolateurs destinés aux régions polluées, l'attention est attirée sur les considérations suivantes:

a) pour une même ligne de fuite, les caractéristiques de tension de tenue peuvent varier selon la forme de la jupe de l'isolateur;

b) pour une même longueur de chaîne, les caractéristiques de tension de tenue peuvent décroître lorsque la résistance mécanique de l'isolateur augmente en raison de la plus faible efficacité de la ligne de fuite pour un diamètre moyen plus grand.

NOTE 2 L'IEC 60815 donne des détails concernant les paramètres importants des profils de jupe pour les isolateurs antipollution.

5 Désignation et marquage en rapport avec le profil d'ailette

La désignation des isolateurs dans les Tableaux 1 à 5 est constituée de la lettre U suivie d'un nombre qui indique la charge de rupture électromécanique ou mécanique spécifiée en kilonewtons.

La lettre B ou C qui suit indique qu'il s'agit respectivement d'un assemblage à rotule ou à chape et tenon.

La lettre suivante S ou L, le cas échéant, indique que le pas est court ou long.

La lettre P, D, V ou T est associée aux profils "pollution", "aérodynamique", "à deux ailettes externes" ou "à trois ailettes externes", qui sont représentés aux Figures 1, 2, 3, 4 et 5, respectivement.

L'IEC 60383-1 spécifie que le marquage des isolateurs doit comporter l'indication de la charge de rupture électromécanique ou mécanique. Cette charge peut être indiquée en utilisant la première partie de la désignation figurant dans la première colonne des Tableaux 1 à 5: par exemple, l'isolateur peut être marqué U 160 pour les modèles U 160 BS, U 160 BL et U 160 BLP.