

Post insulators of ceramic material or glass for nominal voltages greater than 1000 V —

Part 3: Guide to insulator practice

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Foreword

This Part of this British Standard has been prepared under the direction of the Power Electrical Engineering Standards Committee. It is a guide to insulator practice for use with BS 3297-1 and BS 3297-2.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of this British Standard gives guidance on the selection of post insulators for nominal voltages greater than 1 000 V for particular applications. It covers details of information which should be given with enquiries and orders, methods of mounting and information on the design and manufacture of insulators.

2 References

The titles of the publications referred to in this standard are listed on the inside back cover.

3 Definitions

For the purposes of this Part of BS 3297, the definitions given in BS 3297-1 apply.

4 Selection and application of post insulators

4.1 General. The insulation for switching stations should meet those of the following electrical requirements which are specified at the time of order:

- a) the power frequency withstand voltage;
- b) the lightning impulse withstand voltage;
- c) the pollution performance;
- d) the switching impulse withstand voltage;
- e) the radio interference performance.

The choice of insulation levels and the corresponding test requirements will depend on the system voltage, the environment of the switching station (i.e. atmospheric pollution, exposure to lightning, altitude etc.), its importance and the required reliability, which embraces economics and accessibility for inspection and repairs.

4.2 Power-frequency withstand voltage. The required power frequency withstand voltage should be selected from the values given in Table 1.

The required dry power frequency withstand voltage for post insulators used indoors with lightning impulse withstand levels above 325 kV is not covered in this standard.

4.3 Lightning impulse withstand voltage. In addition to the power frequency performance covered by 4.2, the more important systems are designed on the basis that all equipment will withstand a given lightning impulse test voltage. Table 1 gives the internationally agreed lightning impulse withstand test voltages in terms of system highest voltages.

Switching stations are not generally subjected to the same degree of exposure to lightning as overhead transmission lines. Nevertheless, this could happen in some places and it may then be necessary to equip the station with insulation having a lightning impulse level higher than the values given in Table 1. The lightning impulse voltages which may enter the switching station from an associated overhead line are normally controlled by equipping the line insulators in the vicinity of the sub-station with arcing devices, or by including suitable surge arresters in the design of the station. It follows, therefore, that over-insulation of the station equipment would only be necessary in the most exposed situations.

4.4 Pollution performance. A typical pollution test applicable to British conditions is described in Appendix A, but other methods exist. The type of pollution and the shape of the insulator have a bearing on performance, but in the absence of pollution test data, the creepage distance of the insulator may be used as a guide to performance.

For slight pollution, a creepage distance of about 17 mm/kV is generally adequate. For severe pollution, special designs with creepage distances in excess of 25 mm/kV may be necessary. Typical British practice is to use a total creepage distance of about 25 mm/kV, of which 13 mm/kV is protected.

Two classes of minimum nominal creepage distances are given in Table IV of BS 3297-2:1982. Class I is intended for use on post insulators in normal or slightly polluted conditions. Class II gives a higher level of creepage distance within the standard height. When the minimum nominal creepage distance of class II is considered to be inadequate for the service conditions, it may be possible to choose either an insulator of greater height or an insulator with more creepage distance within the standard height. Specification of the creepage distance alone is not sufficient, and other considerations such as the position of the creepage distance and the shape of the shed may apply.

If semi-conducting coatings are applied to the whole surface of the insulator (the stabilized insulator) the surface resistivity and creepage distance depend upon the characteristics of the coatings and should be specified separately.

4.5 Switching impulse withstand voltage. For system highest voltages greater than 245 kV, the insulation requirements of the switching station will frequently be determined by switching impulse performances of the various types of insulator employed. Full scale tests conducted with the standardized conditions of mounting, or with conditions simulating service applications, are necessary to determine this performance.