

Current Standard

- BSEN 62305:2006 - 'Protection against lightning'

Part 1 - General principles

Part 2 - Risk management

Part 3 - Physical damage to structures and life hazard

Part 4 - Electrical and electronic systems within structures

Part 5 - Services (To be published)

Part 1 - General Principles

This part provides the general principles to be followed in the protection against lightning for:

- Structures including their installations, contents as well as persons
- Services (Power, telecom, data, communications connected to a structure)

Part 2 - Risk Management

The purpose is to provide a procedure for the eradication of such a risk. Once an upper tolerable limit for the risk has been established, this procedure allows the selection of appropriate protection measures to be adopted to reduce the risk to or below the tolerable limit.

The lightning current is the primary source of damage. The point of strike sources are as follows:

- S1 - flashes to a structure
- S2 - flashes near a structure
- S3 - flashes to a service
- S4 - flashes near a service

The basic types of damage are as follows:

- D1 - injury to living beings
- D2 - physical damage
- D3 - failure of electrical and electronic systems

The types of risk to be calculated in a structure are as follows:

- R1 - risk of loss of human life
- R2 - risk of loss of service to the public
- R3 - risk of loss of cultural heritage
- R4 - risk of loss of economic value

The types of risk to be calculated in a service are as follows:

- R/2 - risk of loss of service to the public
- R/4 - risk of loss of economic value

Basic procedure

To protect a structure or service against lightning as well as the selection of protection measures, the following should be applied:

1. Identification of the building/structure/object to be protected and its characteristics.
2. Identification of all the types of loss in the building/structure/object and the relevant risk.
3. Evaluation of risk for each type of loss.
4. Evaluation of the need for protection by the comparison of risk R1, R2 and R3 for a structure(R/2 for a service) with the tolerable risk.
5. Evaluation of the cost effectiveness of protection by comparison of the costs of total loss with and without protection measures. The assessment of components of R4 for a structure (R/4 for a service) shall be performed in order to evaluate such costs.

Part 3 - Physical damage to structures and life hazard

The main and most effective measure for protection of structures against physical damage is considered to be the lightning protection system (LPS). It usually consists of both internal and external protection systems.

Part 3 is applicable to:

- Design, installation, inspection and maintenance of an LPS for structures.
- Establish measures for protection against injury due to touch and step voltages.

Relation of lightning protection levels (LPL) and class of LPS

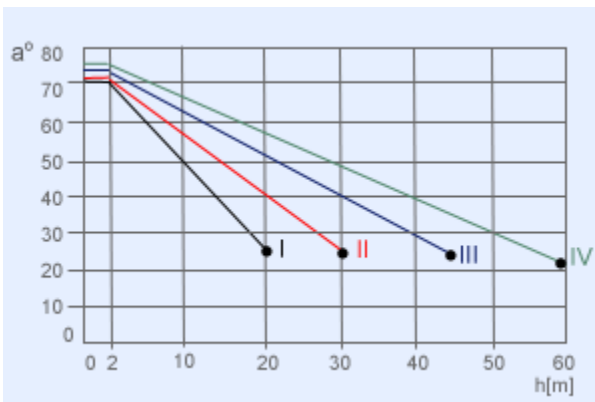
LPL	Class of LPL
I	I
II	II
III	III
IV	IV

The following methods are used to determine the positioning of the air termination network/system:

- Rolling sphere method
- Mesh method
- Protective angle method

The three methods all have values relating to the class of protection:

Class of LPS	Protection Method		
	Rolling sphere radius r m	Mesh size w m	Protection angle a°
I	20	5 x 5	See figure below
II	30	10 x 10	
III	45	15 x 15	
IV	60	20 x 20	



Each class of protection has different values between down conductors:

Class of LPS	Typical Distances <i>m</i>
I	10
II	10
III	15
IV	20

The down conductors are connected to either of the two types of earth systems:

- Type A - Horizontal/vertical earth electrodes connected to each down conductor
- Type B - Buried ring main or foundation earth.

These methods can be used in conjunction with the potential natural components of a building /structure/object.

Part 4 - Electrical and electronic systems within structures

This part provides the information for the design, installation, inspection, maintenance and testing of a LEMP Protection Measures System for electrical and electronic systems within a structure, able to reduce the risk of permanent failures due to lightning electromagnetic impulse.

Performance specifications for power supplies (see sheet)

Performance specification for data/signals and telecommunications cables (see sheet)

Part 5 - Services

To be published

PS/1

Electrical Power Systems

Performance Specification for Power Supplies

Lightning/Surge Protection to the latest standard BSEN62305-4

Main Incoming Switchboards Lightning Protection Zone 1

- • Arresters for power supplies must be capable of handling both Direct Lightning impulses
- • 25kA 10/350µs per pole and Surge currents 40kA 8/20µs per pole eg Combined arrester Class 1/2
- • The arrester must be fully co-ordinated between Lightning and Surge currents
- • The arrester will also limit follow currents of 25kA RMS P.S.S.C. So fuses/MCB's 32A or greater will not blow/trip
- • The arrester must have no leakage current and be able to withstand an insulation test (500v DC) without damage and without being disconnected from the supply
- • The arrester must have a maximum let through voltage of less than 1.5kV even in the case of Direct Lightning
- • The arrester must comply with BSEN62305-4
- • The arrester must be able to withstand multiple direct strikes without damage. Typically 20 x 100kA 10/350µs
- • The arrester must have visual indication eg green LEDs Okay and remote signal contacts to indicate failure

TNCS

Part no. 900374 for TP+N systems

Part no. 900371 for SP+N systems

Sub Distribution Boards Lightning Protection Zone 2

Sub Distribution boards more than 10 metres from the main incoming panel to have additional Surge protection as follows:

- • Maximum discharge current 40kA 8/20µs waveform per pole 160kA 8/20µs TP+N systems Class 2
- • Protection devices must include varistors
- • The arresters must have visual indication of status. Green - ok. Red - defect.
- • The arrester must have thermal dynamic protection which disconnects the device

- from the supply in case of defect. Thus eliminating earth leakage currents
- • The arresters should be of the pluggable type to facilitate easy removal and replacement of defective modules
- • The arresters must have International test approvals either U.L. or KEMA
- • The arrester must comply to International safety requirements for the application of surge protective devices (IEC60364-5-534)
- • The arresters must comply to BSEN62305-4
- • Arresters to be equipped with a fault alarm changeover contact to remotely signal if the device fails
- • To easily distinguish the arrester from circuit breakers and RCD's they must be coloured red

Final Sub Circuits Lightning Protection Zone 3

Final sub circuits should have protection if the connected equipment is more than 15metres away from the sub-distribution board. It is also recommended to protect fire or burglar alarm Panels.

- • Maximum discharge current 5kA 8/20 μ s. Class 3
- • Protection Devices must have indication of failure either visual or acoustic
- • The arresters must comply to BSEN62305-4
- • The arrester to have International test approvals UL or KEMA

Part No TP + N 901130
Part No SP + N 901100

PS/2

Performance Specification for Data/Signal and Telecommunication Cables

Lightning/Surge Protection

Data/Signal Cables

Incoming data links between buildings and systems must be protected against Direct Lightning and Surge impulses on each core and at both ends.

Arresters for Data and Signals to be din rail mountable and have pluggable protection modules for easy replacement and be able to be tested on site arrester type Dehn Blitzductor CT BE.

Arresters for data and signals must also perform to the following specifications

- • Arresters used for protection of data signal lines must be capable of handling Lightning impulse currents of 5kA 10/350 μ s total per pair or 2.5kA 10/350 μ s per line
- • The arresters must also have second stage protection capable of handling Surge currents of 20kA 8/20 μ s per line
- • Arresters must comply to EN61644-1:1999-07 and IEC61643-21, IEC61643-22

(spds v/c)

- • Arresters must have removable protection modules to facilitate easy replacement and hot swapping without disruption of the signal and must be able to be tested on site
- • The whole protection circuit including the decoupling elements must be fitted in the protection module
- • Screens of cables to be earthed directly or indirectly via shield earthing even after installation to and from earth loop via the shield (GDT no 919502)

- • Recommended devices include Blitzductor BCT MOD BE 24 type of arrester