

Down conductors

Down conductors should within the bounds of practical constraints take the most direct route from the air termination system to the earth termination system. The lightning current is shared between the down conductors. The greater the number of down conductors, the lesser the current that flows down each. This is enhanced further by equipotential bonding to the conductive parts of the structure.

Lateral connections either by fortuitous metalwork or external conductors made to the down conductors at regular intervals (see Table 4.6) is also encouraged. The down conductor spacing corresponds with the relevant Class of LPS.

Class of LPS	Typical distances (m)
I	10
II	10
III	15
IV	20

Table 4.6: Typical values of the distance between down conductors and between ring conductors according to the Class of LPS (BS EN 62305-3 Table 4)

There should always be a minimum of two down conductors distributed around the perimeter of the structure. Down conductors should wherever possible be installed at each exposed corner of the structure as research has shown these to carry the major part of the lightning current.

Down conductors should not be installed in gutters or down spouts even if they are insulated due to the risk of corrosion occurring.

Fixing centres for the air termination and down conductors are shown in Table 4.7.

Arrangement	Tape and stranded conductors (mm)	Round solid conductors (mm)
Horizontal conductors on horizontal surfaces	500	1,000
Horizontal conductors on vertical surfaces	500	1,000
Vertical conductors from the ground to 20 m	1,000	1,000
Vertical conductors from 20 m and thereafter	500	1,000

This table does not apply to built-in type fixings which may require special considerations. Assessment of environmental conditions (ie expected wind load) shall be undertaken and fixing centres different from those recommended may be found to be necessary

Table 4.7: Suggested conductor fixing centres (BS EN 62305-3 Table E.1)

We believe this table has an error included. The dimension for tape and stranded conductors fixed to horizontal surfaces should be 1,000mm and not the stated 500mm.

Although this was pointed out to the Technical Committee Working Group, it was too late, as the IEC/CENELEC Standard had already been published. Therefore the error will have to wait until the next technical review, which is due to take place in 2010. BS EN 62305 will then be amended accordingly.

Numerous illustrations are given in Annex E of the positioning and relevant use of natural conductors (fortuitous metalwork) as down conductors and lateral conductors and equipotential bonding, all elements contributing to a more effective LPS.

Sometimes it is not possible to install down conductors down a particular side of a building due to practical or architectural constraints. On these occasions more down conductors at closer spacings on those sides that are accessible should be installed as a compensating factor.

The centres between these down conductors should not be less than one third of the distances given in Table 4.6.

A test joint should be fitted on every down conductor that connects with the earth termination. This is usually on the vertical surface of the structure, sufficiently high to minimise any unwanted third party damage/interference. Alternatively, the test or disconnection point can be within the inspection chamber that houses the down conductor and earth rod. The test joint should be capable of being opened, removed for testing and reconnected. It shall meet the requirements of BS EN 50164-1.

Similar to BS 6651, this standard permits the use of an aesthetic covering of PVC or protective paint over the external LP conductors. (See clause 4.2 of BS EN 50164-2(A1)).