

Appendix 1: Process for the management of ignition by lightning

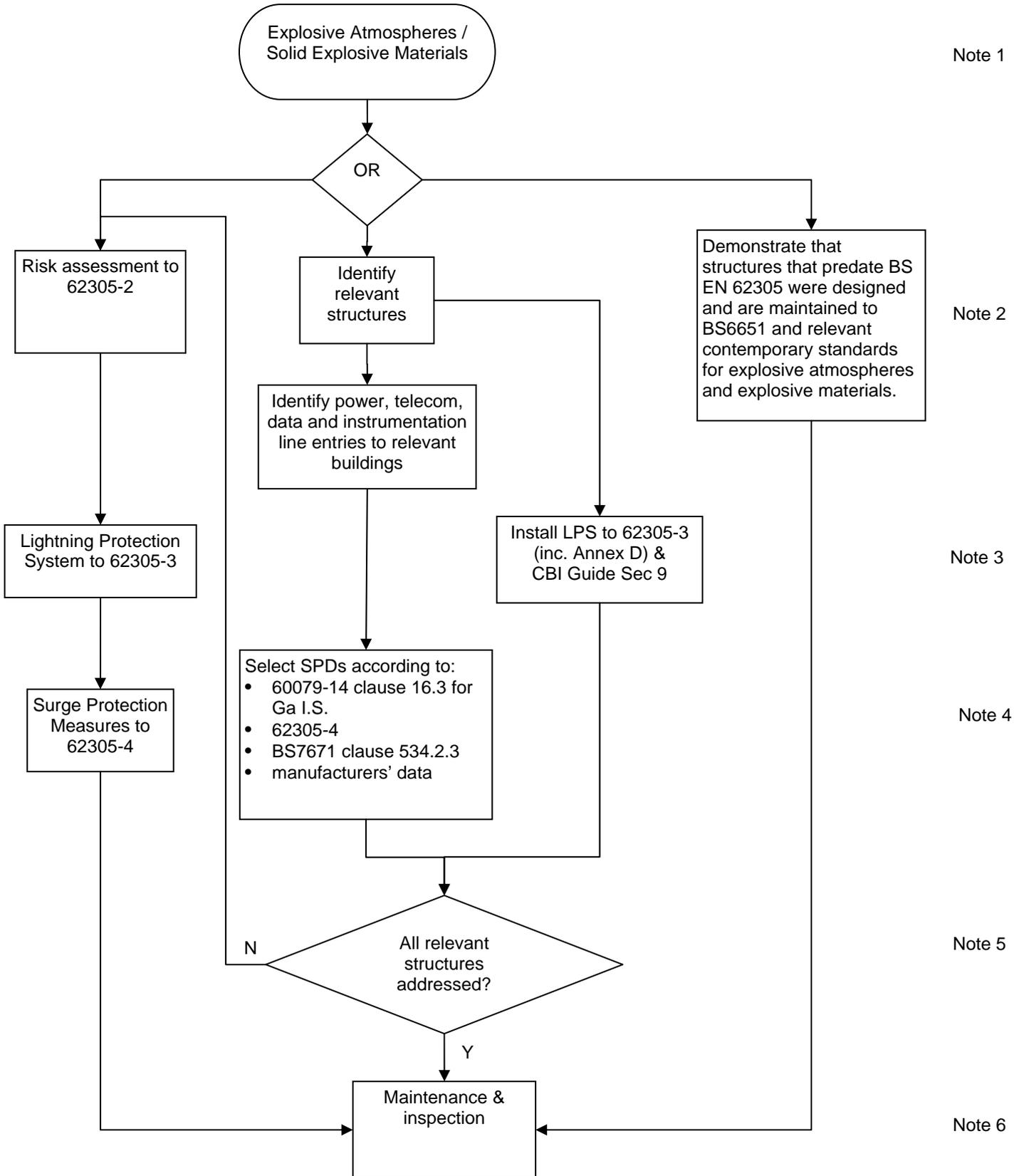


Figure 1: Process for the management of ignition by lightning

Notes to Figure 1

Note 1: This guidance deals only with the ignition of onshore explosive atmospheres and solid explosive materials.

Note 2: Duty Holders may choose to apply relevant good practice from first principles or they may choose to first consider structures with a risk of explosion. The latter option considers basic requirements and specific applications. The result should be that resources are quickly targeted only at structures that pose a reasonably foreseeable risk. In either case, competent advice should be sought where necessary.

Annex D of BS EN 62305-3 and CBI Explosives Industry Group guidance provide information for lightning protection systems in the case of structures with a risk of explosion. In summary, the types of structures that should be considered for lightning protection, including surge suppression, are:

- outdoor process plant containing dangerous substances;
- above ground flammable storage tanks;
- structures containing explosive atmospheres (inc. the storage of flammable liquids in containers);
- structures containing solid explosive materials;
- structures where physical damage could impact on the above.

The current version of BS EN 62305-2 (Table C.5) specifies different risk reduction factors relating to explosion depending on hazardous area classification (zones 0, 20, 1, 21, 2 and 22) where the previous version specified a risk reduction factor of unity (no risk reduction) for all structures with risk of explosion. As a consequence, risk assessment might be a more attractive option for zone 2 and 22 explosive atmospheres.

Many industrial installations predate the publication of BS EN 62305 but were built and maintained to BS6651, the relevant standard of the time. For such structures, no further assessment of lightning protection is necessary provided that the application of BS6651 can be demonstrated, however, BS EN 62305 should be applied to modifications to existing installations.

Evidence that structures had been designed and are being maintained to BS6651 would consist of the records specified by Clause 33 of BS6651 or equivalent.

Contemporary standards would include BS5345.

Note 3: Annex D of BS EN 62305-3 and CBI Explosives Industry Group guidance provide engineering guidance for specific applications, for example on:

- earthing arrangements;
- the adequacy of equipotential bonding;
- the adequacy of structural components;

- the essentially self-protecting nature of certain types of structures used for the storage of flammable gases or liquids that can produce flammable vapours;
- specific requirements for zoned areas.

In some cases, Annex D refers to other parts of BS EN 62305-3 which allow choices to be made depending on the required class of lightning protection system. The required class of lightning protection can be either established by risk assessment or can be chosen to be Class I.

Note 4: Surge protection is addressed by BS EN 62305-4.

Surge protective devices (SPDs) shall be provided as part of the LPS for all locations where explosive material is present.

The need for SPDs to be provided as part of the LPS for structures containing hazardous areas depends on risk, therefore consideration should have been given to:

- the zone and extent of the hazardous areas (for example, the need for SPDs would be proportionately greater for zone 1 and 21 than for zone 2 and 22);
- the location of equipment susceptible to surge damage relative to the zoned areas;
- other practical surge protection measures such as:
 - equipotential bonding within the structure;
 - earthing of incoming cable trays;
 - bonding of incoming cable trays to the structure;
 - the level of shielding of cables entering the structure provided by the cable support system.

Note 5: Where structures with a risk of explosion cannot be addressed by Annex D of BS EN 62305-3, a risk assessment should be carried out as defined by BS EN 62305-2.

Note 6: Installations should be subject to periodic maintenance and inspection to ensure that safety measures remain effective. Annex E.7 of BS EN 62305-3 provides guidance on maintenance and inspection of lightning protection systems. Clause 9.3 of BS EN 62305-4 provides guidance on maintenance and inspection of surge prevention measures.

Clauses 31 to 34 of BS 6651 provide guidance on inspection, testing and maintenance that may be applied to installations that predate the publication of BS EN 62305.