

The density of water delivered by each sprinkler should be calculated by the physical area of coverage, as opposed to the maximum area of the data sheet. In all cases, the manufacturer's minimum head pressure for the corresponding coverage area should be met or exceeded (see [Annex B, B.7](#)).

5.4 Extent of sprinkler protection

COMMENTARY ON 5.4

BS 5306-0:2020, Clause 15 gives guidance on the use of sprinkler protection in the presence of electrical equipment and concludes it is generally safe to do so.

Sprinkler protection should be provided in all parts of the premises, however, sprinkler protection may be omitted from the following areas unless it is required by a fire strategy or risk assessment:

NOTE Where a risk assessment is carried out, it needs to take into account presence of fuel load (e.g. linen), presence of potential ignition sources (e.g. immersion heater) and consequence (e.g. impact upon fire protection to the building or escape routes).

- a) bathrooms and shower rooms with a floor area less than 5 m², with linings conforming to [BS EN 13501-1:2018](#), Class A1, A2-s3, d2 and B-s3, d2, and which are not prepared for white goods, such as washing machines, dryers, electric showers or water heaters;
- b) enclosed staircases containing only materials conforming to [BS EN 13501-1:2018](#), Class B-s3 or better for construction materials and B(fl) or better for flooring, including sub categories such as d0, d1, d2 for construction materials and s1 and s2 for flooring, surface spread of flame and constructed as a fire-resistant separation;
- c) ceiling voids;
- d) enclosed vertical shafts (e.g. lifts or service shafts) containing only materials conforming to [BS EN 13501-1:2018](#), Class B-s3 or better for construction materials and B(fl) or better for flooring (including sub categories such as d0, d1, d2 for construction materials and s1 and s2 for flooring), surface spread of flame and constructed as a fire-resistant separation;
- e) cupboards and pantries with a floor area of less than 2 m² or where the least dimension does not exceed 1 m which are not prepared for consumer units or electrical equipment (excluding a single light);
- f) uninhabited loft/roof voids;
- g) water closet (WC) with a floor area less than 5 m², with linings conforming to [BS EN 13501-1:2018](#), Class A1, A2-s3, d2 and B-s3, d2, and which are not prepared for white goods, such as washing machines, dryers, electric showers or water heaters;
- h) attached buildings, such as garages and plant rooms without direct access from within the protected building;
- i) crawl spaces; and
- j) external balconies permanently open to the outside.

5.5 Classification of residential and non-residential occupancies

COMMENTARY ON 5.5

In some parts of the building, residential sprinklers might not provide adequate protection. Therefore, the nature of occupancies needs to be determined and the type of sprinkler selected accordingly. This process could determine that some areas can be adequately protected with residential sprinklers (i.e. sprinkler heads conforming to [BS EN 12259-14](#)) and others require protection by so-called "commercial and industrial" sprinkler heads (i.e. sprinkler heads conforming to [BS EN 12259-1](#)).

Where limited areas of protection conforming to BS EN 12845 design criteria (i.e. using sprinkler heads to BS EN 12259-1) are specified by this British Standard, the applicable design criteria are repeated in this British Standard for ease of reference and are to be applied. It is not necessary to apply BS EN 12845 in full unless more robust sprinkler protection in full conformity to that standard is specified.

In all cases a hazard review should be carried out to determine the correct classification of occupancy. The recommendations in this subclause should be used to assist in selecting the correct design criteria for non-residential areas of a building which might require sprinkler protection using sprinkler heads to BS EN 12259-1.

NOTE Examples of appropriate occupancies, design density and number of operation head are provided in [Table 3](#).

In no circumstances should the category of any area be less than that given in [Table 2](#).

All other non-residential areas should meet the recommendations of [5.6](#).

Table 3 — Examples of classification of areas and design criteria for areas protected with “Residential” BS EN 12259-14 sprinkler heads

Occupancy	BS 9251 category (see Table 1)	Minimum density mm/min	Minimum number of design sprinklers
One or two car garage ^{A)} , where sprinkler protected, attached to a dwelling	1	2.10 ^{B)}	In accordance with Table 2
Car parking ^{A)} within or beneath a block of flats	2, 3 and 4	See Table 4	See Table 4
Bin store within or beneath the flats	2, 3 and 4	See Table 4	See Table 4
Limited office areas (e.g. concierge or site management) ^{C)}	2, 3 and 4	2.80	As per Table 2
Residents’ storage sheds/tenant stores ^{A)}	2, 3 and 4	See Table 4	See Table 4
PTSN/CCTV/Electrical rooms	2, 3 and 4	2.80	As per Table 2
Plant rooms	2, 3 and 4	See Table 4	As per Table 2
Domestic laundry/utility room	1	2.10	As per Table 2
Laundry (with storage and processing of linen, e.g. institutional, care home)	2, 3 and 4	See Table 4	See Table 4
Laundry (communal facility)	2, 3 and 4	2.80	As per Table 2
Domestic kitchens	1	2.10	As per Table 2
Hairdressing room	2, 3 and 4	2.80	As per Table 2
Retail (e.g. shop or kiosk)	2, 3 and 4	See Table 4	See Table 4
Foyer/reception	2, 3 and 4	2.80	As per Table 2
Bar/restaurant/cafe	2, 3 and 4	See Table 4	See Table 4
Kitchens in student hub accommodation (e.g. self-catering)	3 and 4	2.80	As per Table 2
Kitchens ^{D)} in residential care or similar premises, e.g. care home ≤50 m ²	2 and 3	2.80	As per Table 2
Kitchens ^{D)} in residential care or similar premises, e.g. care home >50 m ²	2 and 3	See Table 4	See Table 4

Table 3 (continued)

Occupancy	BS 9251 category (see Table 1)	Minimum density mm/min	Minimum number of design sprinklers
<p>^{A)} Attention is drawn to the need to consider protection from frost damage.</p> <p>^{B)} 2.10 mm/min is considered a low density to protect car(s) and storage. Higher densities might be warranted in certain circumstances.</p> <p>^{C)} See also Table 4. Conduct a hazard evaluation to determine which option is most appropriate.</p> <p>^{D)} Kitchens with deep oil cookers should be fitted with an appropriate local application system in addition to the sprinkler protection identified in this table (e.g. LPS1223, see BS 5306-0).</p>			

All other non-residential areas should be sprinkler protected in accordance with 5.6 or BS EN 12845.

5.6 Ordinary hazard protected areas

Where BS EN 12259-1 sprinkler heads are specified in 5.5 and Table 3 (by reference to Table 4), the following parameters should be used:

- the system should be a wet pipe system, with individually thermally actuated sprinkler heads;
- full hydraulic calculation method should be used;

NOTE 1 BS EN 12845 pre-calculation design method cannot be used.

- a minimum design density of 5 mm/min should be applied;
- the area of operation should be in accordance with Table 4;
- quick response heads conforming to BS EN 12259-1 should be used;

NOTE 2 Recessed and concealed heads are not designated a thermal sensitivity rating. The standard thermal sensitivity test is not appropriate due to at least one of the following reasons:

- the nature of the sprinkler assembly;
- orientation of the sprinkler frame when installed; or
- location of the temperature-sensitive element in relation to the roof or ceiling line.

The temperature-sensitive elements and their supporting components used in the construction of these sprinklers operate in accordance with the special or quick response requirements, when tested in a conventional, spray or sidewall pattern sprinkler frame or suitable mounting assembly.

- a minimum operating pressure of 0.35 bar for K 80 heads or as per the manufacturer's data sheet for any other K factor should be used;
- head coverage area should be 12 m² maximum;
- head spacing should be 4 m × 3 m maximum;
- the distance from walls should be a maximum of half design spacing;
- the vertical distance of the deflector from the ceiling should be a maximum of 150 mm;
- Table 4 should be applied; and
- duration of water supply should be in accordance with Table 2.

NOTE 3 Plastic pipe systems might not be suitable for these areas. Refer to the manufacturer's instructions.

Where the area of the compartment (fire) of any occupancy listed in Table 4 exceeds 100 m², BS EN 12845 should be applied in full.

Table 4 — Examples of classification of areas and design criteria for areas to be protected with BS EN 12259-1 sprinkler heads

Occupancy	Minimum density mm/min	Area of operation ^{A)}
Car parking ^{B)} within or beneath a block of flats	5.00	100 m ²
Bin store ^{B), C)} within or beneath the flats		72 m ²
Limited office areas (e.g. concierge or site management) ^{D)}		72 m ²
Residents' storage sheds/tenant stores ^{B)}		4 heads
PTSN/CCTV/electrical rooms		72 m ²
Plant rooms		100 m ²
Laundry (with storage and processing of linen, e.g. institutional, care home)		100 m ²
Laundry (communal facility)		72 m ²
Hairdressing room		72 m ²
Retail (e.g. shop)		100 m ²
Bar/restaurant/cafe		72 m ²
Kitchens in student hub accommodation (e.g. self-catering)		72 m ²
Kitchens ^{E)} in residential care or similar premises (e.g. care home) ≤50 m ²		72 m ²
Kitchens ^{E)} in residential care or similar premises (e.g. care home) >50 m ²		72 m ²

^{A)} If the compartment (fire) area is less than 50 m², a maximum of four heads is required as the area of operation. Where greater than 50 m², refer to area of operation or compartment (fire) area, whichever is the lesser.

^{B)} Attention is drawn to the need to consider protection from frost damage.

^{C)} On the basis of the bin store building or compartment (fire) being of at least a minimum of 1 h fire resisting construction from the rest of the buildings.

^{D)} See also [Table 3](#). Conduct a hazard evaluation to determine which option is most appropriate.

^{E)} Kitchens with deep oil cookers should be fitted with an appropriate local application system in addition to the sprinkler protection identified in this table (e.g. LPS1223, see [BS 5306-0](#)).

5.7 Sprinkler coverage and positioning

5.7.1 General

Residential sprinkler spacing and positioning should be in accordance with the following:

- the maximum area protected by each sprinkler should be in accordance with its approved listing performance or 25 m², whichever is the lesser;
- sprinklers should be not more than 5.5 m apart;
- sprinklers adjacent to a wall or partition should not be more than half spacing and not more than 2.75 m from that wall or partition;
- the distance between sprinklers within a compartment (sprinkler) should be not less than 2.4 m, except where there is an intervening constructional feature preventing adjacent sprinklers wetting each other;