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# Zonal requirements of BS 7671: 2008 for locations containing a bath or shower

Section 701 of BS 7671: 2008 (IEE Wiring Regulations 17th Edition) covers locations containing a bath or shower. Its requirements supplement and modify the general requirements of that standard. The requirements in Section 701 use a zonal system similar to, but not the same as, that used in Section 601 of BS 7671: 2001 (IEE Wiring Regulations 16th Edition) for locations containing a bath or shower

**T**his article explains the changes that Section 701 makes to the descriptions of the zones, compared with those in Section 601 of BS 7671: 2001. The article also gives guidance on the requirements of Section 701 for the selection and erection of electrical equipment in relation to the zones.

A future edition of *Connections* will give guidance on some of the other changes included in Section 701.

### Zones

There are three (previously four) precisely-dimensioned zones, designated as zone 0, zone 1 and zone 2.

The zones reflect the perceived level of risk of electric shock in each zone and beyond. They are determined taking account of walls, doors, fixed partitions, ceilings and floors, where these effectively limit the extent of a zone.

Descriptions of the zones are given below and shown diagrammatically in Figure 1. The figure also shows the differences

between the dimensions of the zones as given in the 2001 and 2008 editions of BS 7671.

#### Description of Zone 0:

Zone 0 is the interior of the bath tub or shower basin. For showers without a basin, such as a wet-room, the height of zone 0 is 0.10 m and its surface extent has the same horizontal extent as zone 1.

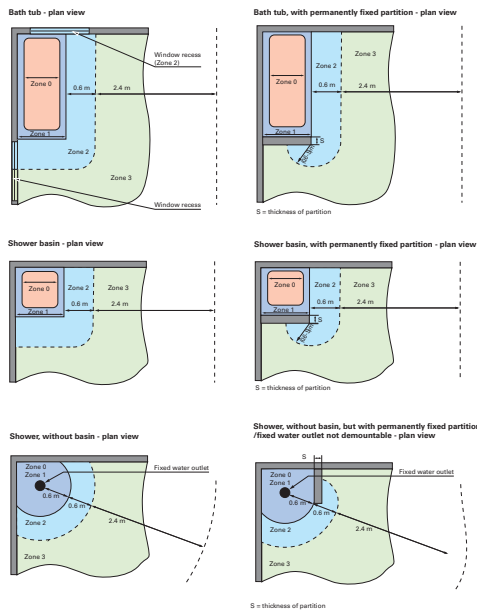
#### Description of Zone 1:

Zone 1 is limited by:

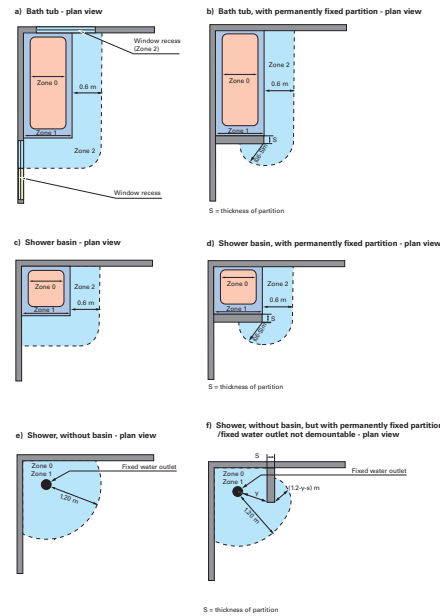
- (i) the finished floor level and the horizontal plane corresponding to the highest fixed shower head or water outlet or the horizontal plane lying 2.25 m above the finished floor level, whichever is higher; and
- (ii) the vertical surface:
  - a) circumscribing the bath tub or shower basin; or
  - b) at a distance of 1.20 m from the centre point of the fixed water outlet on the wall or ceiling for showers without a basin.

1 Diagrams showing the differences between the zone dimensions in the 2001 and 2008 editions of BS 7671

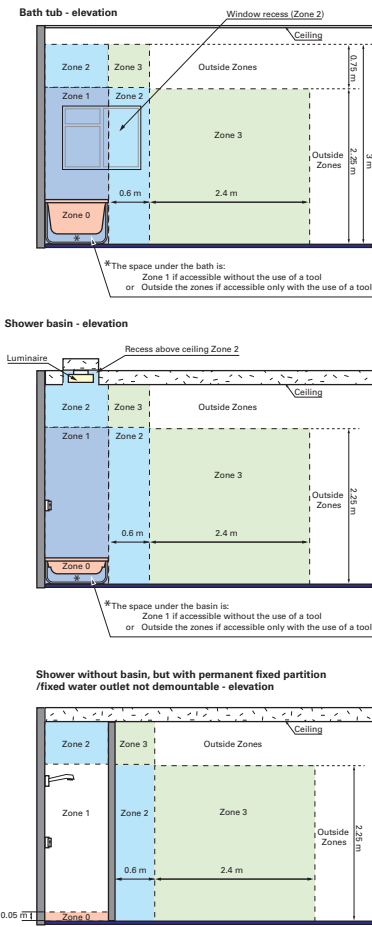
Zone Classification 16th Edition



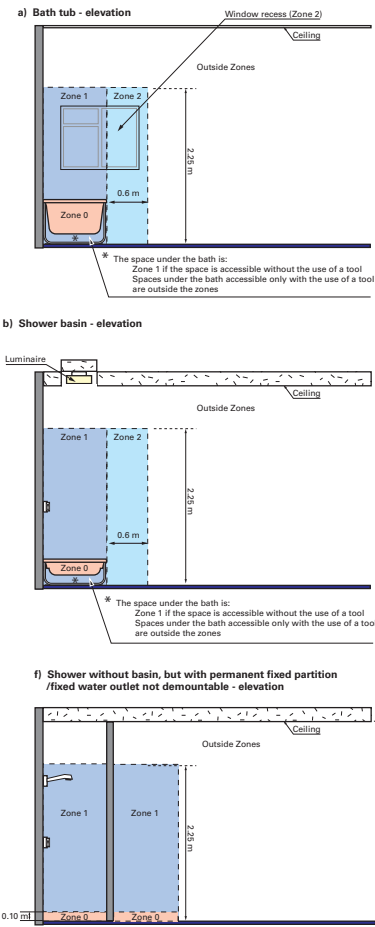
UPDATED TO:  
17<sup>TH</sup> EDITION  
BS 7671:2008  
Zone Classification 17th Edition



Zone Classification 16th Edition



UPDATED TO:  
17<sup>TH</sup> EDITION  
BS 7671:2008  
Zone Classification 17th Edition



**Table 1: Minimum degrees of ingress protection according to the particular zonal requirements**

Zone	IP Code (BS EN 60529 1,2 and 3)	
	Where water jets are not likely to be used for cleaning (eg for communal baths or showers)	Where water jets are likely to be used for cleaning (eg for communal baths or showers)
Zone 0	IPX7	IPX7
Zone 1	IPX4	IPX5
Zone 2	IPX4	IPX5
Outside all zones	General rules apply	General rules apply, which might necessitate IPX5

Notes:

- 1) BS EN 60529: Specification for the degrees of protection provided by enclosures (IP Code).
- 2) Where equipment is not IP coded, an equivalent degree of ingress protection is required.
- 3) The requirements do not apply to shaver supply units to BS EN 61558-2-5 installed in zone 2 where direct spray from showers is unlikely.

Zone 1 does not contain zone 0. The space under the bath or shower basin is considered to be zone 1. However, if that space is only accessible with a tool, it is considered to be outside the zones.

*Description of Zone 2:*

Zone 2 is limited by:

- (i) the finished floor level and the horizontal plane corresponding to the highest fixed shower head or water outlet or the horizontal plane lying 2.25 m above the finished floor level, whichever is higher; and
- (ii) the vertical surface at the boundary of zone 1 and the parallel vertical surface at a distance of 0.6 m from the zone 1 border.

For showers without a basin, there is no zone 2 but an increased

**Table 2: Switchgear, controlgear and accessories that may be installed**

Permitted equipment <sup>(1)</sup>		Remarks
Zone 0	Switches and controls incorporated in fixed current-using equipment suitable for use in the zone (see Table 3).  Insulating pull cords of cord operated switches <sup>(2)</sup> .	
Zone 1	Switches and controls incorporated into fixed current-using equipment suitable for use in the zone (see Table 3).  Insulating pull cords of pull cord operated switches <sup>(2)</sup> .  Switches of SELV circuits supplied at a nominal voltage not exceeding 12 V a.c. or 30 V ripple-free d.c. <sup>(3)</sup> .	
Zone 2	Switches and controls incorporated in fixed current-using equipment suitable for use in the zone (see Table 3).  Insulating pull cords of cord operated switches <sup>(2)</sup> .  Switches and socket-outlets of SELV <sup>(3)</sup> circuits.  Shaver supply units <sup>(4)</sup> .	Other than the equipment listed opposite, no switchgear, accessories incorporating switches or socket-outlets may be installed.
Outside of Zones 0, 1, 2	With certain exceptions (see opposite), the general requirements of BS 7671 apply.	Socket-outlets other than those on a SELV system and shaver units <sup>(4)</sup> are prohibited within a distance of 3 m horizontally from the boundary of Zone 1.

Notes:

- 1) All circuits must have additional protection by means of one or more RCDs having a rated residual operating current ( $I_{\Delta n}$ ) not exceeding 30 mA and an operating time not exceeding 40 ms at a residual current of  $5 I_{\Delta n}$  (Regulation 701.411.3.3 refers)
- 2) Complying with BS EN 60669
- 3) The SELV source must be located outside of Zones 0, 1 and 2
- 4) Complying with BS EN 61558-2-5

**Table 3: Permitted current-using equipment related to the zone**

	Permitted equipment <sup>(1)</sup>
Zone 0	<p>Fixed, permanently connected current-using equipment that is suitable for the conditions of zone 0 according to the manufacture's instructions for use and mounting, and is protected by SELV at a nominal voltage not exceeding 12 V a.c. or 30 V ripple-free d.c. <sup>(2)</sup>.</p> <p>Electric heating units embedded in the floor. Units to be covered by a metallic sheath or a metal enclosure or a metallic grid, which must be earthed unless the heating system is SELV.</p>
Zone 1	<p>The following fixed current-using equipment provided it is suitable for the conditions of zone 1 according to the manufacture's instructions for use and mounting:</p> <p>Whirlpool units</p> <p>Electric showers</p> <p>Shower pumps</p> <p>Equipment is protected by SELV or PELV at a nominal voltage not exceeding 25 V a.c. or 60 V ripple-free d.c. <sup>(2)</sup></p> <p>Ventilation equipment e.g. fans</p> <p>Towel rails</p> <p>Water heating appliances</p> <p>Luminaires</p> <p>Electric heating units embedded in the floor. Units to be covered by a metallic sheath or a metal enclosure or a metallic grid, which must be earthed unless the heating system is SELV.</p>
Zone 2	Other fixed current-using equipment provided it is suitable for the conditions of zone 2.
Outside of Zones 0, 1, 2	The general requirements of BS 7671 apply.

**Notes:**

- 1) All circuits must have additional protection by means of one or more RCDs having a rated residual operating current ( $I_{\Delta n}$ ) not exceeding 30 mA and an operating time not exceeding 40 ms at a residual current of  $5 I_{\Delta n}$  (Regulation 701.411.3.3 refers)
- 2) SELV source located outside of Zones 0, 1 and 2

zone 1 is provided by the horizontal dimension of 1.2 m mentioned in Regulation 701.32.3(ii)b.

**Selection and erection of electrical equipment**

Each item of electrical equipment in a location containing a bath or shower must be selected and erected to be suitable for the external influences likely to occur at the particular point of installation. The external influences include steam, falling drops of water and sprays and/or jets from shower nozzles. Regulation 701.512.2 gives rules regarding the degree of protection against water ingress. The minimum permitted degree of

ingress protection related to each zone is shown in Table 1.

**Zonal requirements for the selection and erection of equipment**

Table 2 lists the switchgear, controlgear and accessories that may be installed in each zone of a room containing a bath or shower. Table 3 lists the items of current-using equipment that may be installed in each zone.

**Socket-outlets**

As indicated in Table 2, BS 7671: 2008 permits general-purpose socket-outlets (such as BS 1363 13 A socket-outlets) be installed

in a location containing a bath or shower. However, it is stressed that such socket-outlets are **prohibited** within a distance of 3 m horizontally from the boundary of zone 1 (Regulation 701.512.4 refers).

In practice, many bathrooms and shower rooms will be too small for a general purpose socket-outlet to be installed in them, due to there being less than 3 m from the edge of zone 1 to the walls of the room.

As for all circuits in a location containing a bath or shower, a circuit supplying socket-outlets must have additional protection by an RCD (see note 1 of Table 2).