

Section 701 - Locations containing a bath or shower

The IET's technical helpline often receives queries about Section 701 of the Wiring Regulations – Locations containing a bath or shower. In this article, Chief Engineer Geoff Cronshaw looks at some of the key requirements and frequently asked questions.

Scope

The particular requirements of this section apply to the electrical installations in locations containing a fixed bath (bath tub, birthing pool) or shower, and to the surrounding zones as described in the Wiring Regulations. The Wiring Regulations do not apply to emergency facilities, for example emergency showers used in industrial areas or laboratories.

The 17th Edition, published in 2008, introduced a number of amendments. These included changes to the zonal system, RCD protection on all bathroom circuits, and 230 V socket outlets permitted 3 m horizontally from the boundary of zone 1; supplementary equipotential bonding may be omitted subject to the Wiring Regulations being met.

The zonal system

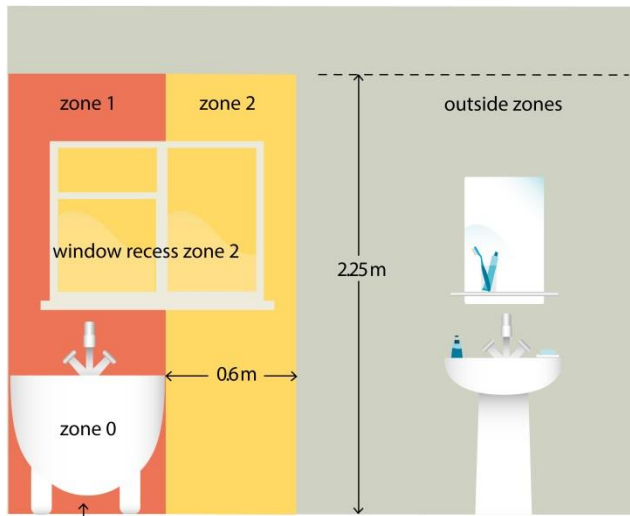
The Regulations state:

Horizontal or inclined ceilings, walls with or without windows, doors, floors and fixed partitions may be taken into account where these effectively limit the extent of locations containing a bath or shower as well as their zones.

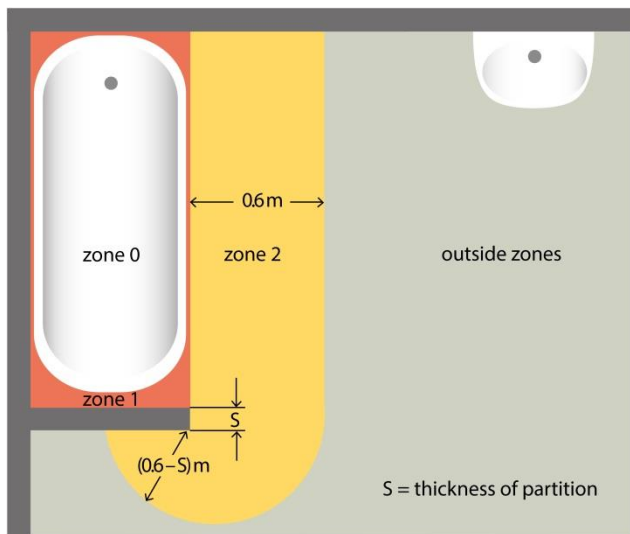
Zones 0, 1 and 2 provide a very practical method of specifying requirements (for example, for the protection of equipment against the ingress of water and protection against electric shock, etc) in a specific and unambiguous way. Equipment is either in a zone or outside a zone and this can be easily determined by measurement.

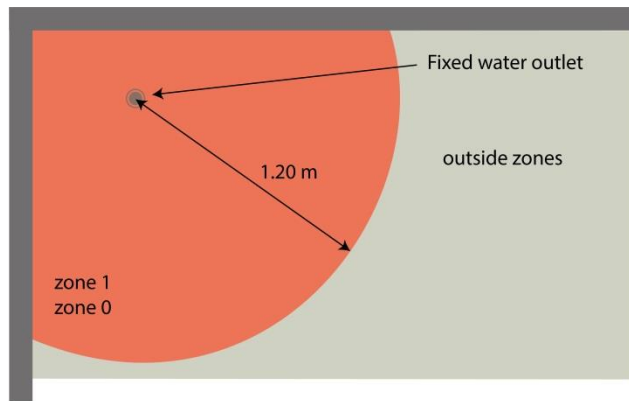
The height of zone 1 and zone 2 are limited either by the horizontal plane corresponding to the highest fixed shower head or water outlet, or the horizontal plane lying 2.25 m above the finished floor level, whichever is higher.

- Zone 1 is limited by the vertical surface circumscribing the bath tub or shower basin.
- Zone 1 is extended for showers without a basin for a fixed water outlet to a distance of 1.20 m from the centre point of the water outlet.
- Zone 2 is limited by the vertical surface at the boundary of zone 1 and the parallel vertical surface at a distance of 0.6M from the zone 1 border.



The space under the bath is:
Zone 1 if accessible without the use of a tool
Outside the zones if accessible only with the use of a tool





RCD Protection

Regulation 701.411.3.3 requires that additional protection shall be provided for all circuits of the location by the use of one or more RCDs having the characteristics specified in Regulation 415.1.1. This was a significant change introduced by the 17th Edition. This means that all circuits, including lighting, electric showers, heated towel rails, etc. require RCD protection not exceeding 30 mA.

230 V socket outlets

The 17th Edition introduced another important change: Regulation 701.512.3 permits 230 V socket outlets to be installed in a room containing a bath or shower, providing they are installed 3m horizontally from the boundary of zone 1.

Supplementary equipotential bonding

The 17th Edition introduced a significant change for supplementary equipotential bonding. Regulation 701.415.2 states that, where the location containing a bath or shower is in a building with a protective equipotential bonding system in accordance with Regulation 411.3.1.2, supplementary equipotential bonding may be omitted where all of the following conditions are met:

- (i) all final circuits of the location comply with the requirements for automatic disconnection in accordance with 411.3.2;
- (ii) all final circuits of the location have additional protection by means of an RCD in accordance with 701.411.3.3; and
- (iii) all extraneous-conductive-parts of the location are effectively connected to the protective equipotential bonding in accordance with 411.3.1.2.

This means that the designer needs to make an assessment that all extraneous-conductive-parts of the location are effectively connected to the protective equipotential bonding, in accordance with 411.3.1.2.

External influences

Any wiring system or equipment selected and installed must be suitable for its location and able to operate satisfactorily without deterioration during its working life. The presence of water can occur in several ways (for example, splashing, steam/humidity, condensation) and

at each location where it is expected to be present its effects must be considered and suitable protection must be provided.

Consequently, Section 701 requires that electrical equipment in zones 1 and 2 shall have a degree of protection of at least IPX4.

Electrical equipment exposed to water jets (for example, for cleaning purposes), shall have a degree of protection of at least IPX5. Section 701 does not specify any additional ingress protection requirements beyond zone 2. This means that accessories, such as switches and fused connection units, can be installed beyond zone 2, subject to the requirements of Regulation 512.2 (external influences).

Current-using equipment

Regulation 701.55 restricts the type of fixed and permanently connected current-using equipment that can be installed in zone 1. Washing machines and tumble dryers may be installed in a bathroom provided they are:

- supplied from a switched fused flex outlet installed outside the zones (socket outlets are only allowed 3 m horizontally from the boundary of zone 1);
- protected by a 30 mA RCD; and
- permitted for such installation by the manufacturer.

Shaver supply units

The minimum degree of protection for equipment installed in zones 1 and 2 is IPX4, or IPX5 where water jets are likely to be used for cleaning purposes. An exception to this requirement is a shaver supply unit complying with BS EN 61558-2-5 which, although it does not meet the requirements of IP4X, is permitted in zone 2 but must be located where direct spray from showers is unlikely. This type of shaver supply unit is the only type that is permitted in a bathroom or shower room.

Frequently asked questions

Extractor fans

Are 230 V extractor fans permitted in zones 1 and 2 of a room containing a bath or shower?

Yes, a suitable 230 V extractor fan may be installed both in zones 1 and 2, and outside the zones. If an extractor fan is installed in zone 1 or 2 it must be protected against the ingress of moisture to at least IPX4 and be suitable according to manufacturer's instructions. Regulation 701.512.2 requires that equipment exposed to water jets (for example, for cleaning purposes), shall have a degree of protection of at least IPX5.

An extractor fan supplied from a lighting circuit for a bathroom without a window should have its own means of isolation, as otherwise replacement or maintenance of the fan would have to be carried out in the dark. An isolation switch for a fan with an overrun facility will need to be triple-pole (switch wire, line and neutral), and must be installed outside zones 0, 1 and 2.

Socket outlets

Are 230 V socket outlets permitted in a room containing a bath or shower?



Yes, 230 V 13 A socket outlets are allowed, but only if they are at least 3 m horizontally from the boundary of zone 1.

Plate switches

Are 230 V lighting switches (plate switches) permitted in a room containing a bath or shower?

Yes, a plate switch is allowed outside the zones of a bathroom. A switch should be at least 0.6 m from the edge of the bath or shower (outside the zones) and must be suitable for the location. The cords of cord-operated switches are allowed in zones 1 and 2 and are recommended for bathrooms and shower rooms to account for the humidity and condensation that could occur.

Luminaires (light fittings)

Are 230 V light fittings permitted above a shower or bath (zone 1) in a room containing a bath or shower?

Yes, 230 V fittings may be installed above a shower or bath but they must be at least IPX4, i.e. enclosed and water protected. If installed more than 0.6 m from the edge of a shower basin or bath (outside the zones) no special fitting is required but the luminaire must be of a suitable design for the conditions.

Equipment installed in the zones

Check that manufacturer's instructions confirm that the equipment is suitable for use in the relevant zone before installation in addition to checking the IP rating.

More information

For more information please refer to the 17th Edition of the Wiring Regulations (BS 7671:2008) (2013). Also, help is at hand, in the form of a new edition of IET Guidance Note 7 (Special Locations), which will take into account the proposed Amendment 3 of BS 7671:2008. The new edition of BS 7671 and the associated titles will be available from January.