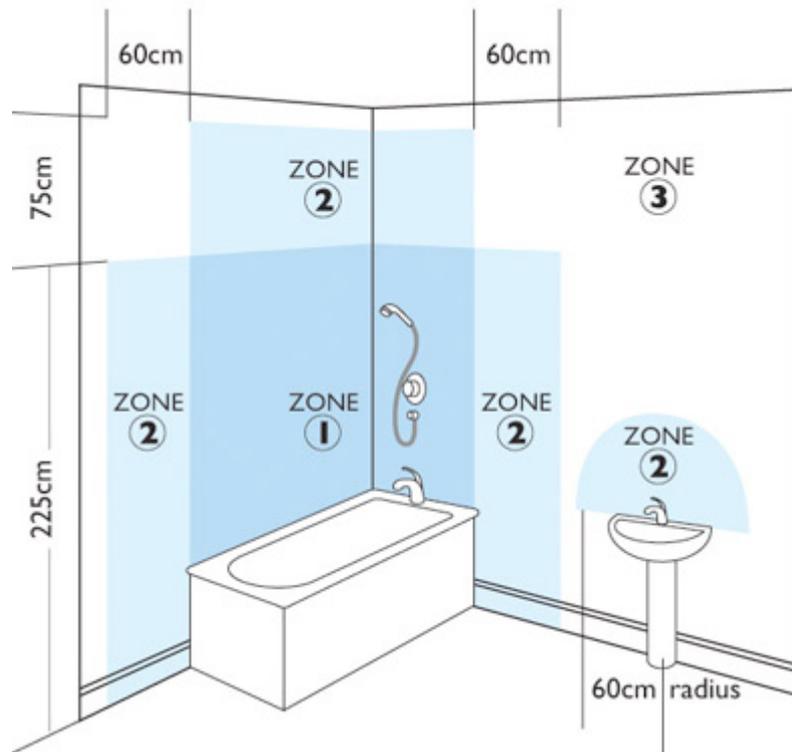


# Information on Zones & IP (ingress Protection) Ratings



## Bathroom Safety

### Electrical Products & Bathroom Safety

Bathrooms are considered to be a 'special location' for electrical installations because they have an increased risk of electric shock for the users, due to the proximity of water. Electrical contractors make bathroom installations as safe as possible with careful adherence to wiring and building regulations, wise choice of equipment and a good 'splash' of common sense (pardon the pun!). We all know the sorts of products that can be found in bathrooms, lighting, showers, fans, heaters, shaver sockets and towel rails. But what are the rules for the installation of these products that contractors must follow and can, using certified products, help them comply with the regulations?

The rules

#### i) Wiring regulations

In the UK, all fixed electrical installations in dwellings must legally comply with BS7671 the 'Requirements for Electrical Installations'. This Standard gives specific guidance on the design, installation, testing, verification and certification of such installations. Section 601, particularly covers 'Locations containing a bath or shower'.

Section 601, divides a bathroom into zones which take into account windows, doors, walls ceilings and partitions and is based on a perceived level of risk zone. Each zone has specific requirements regarding the electrical equipment that can be used in that zone.

Zone 0: the interior of the bathtub or shower basin.

Zone 1: the area around the bathtub or shower basin up to a height of 2.25m above the floor and at a radius of 1.2m from the water outlet.

Zone 2: is limited by the vertical planes external to zone 1 and parallel vertical plane (s) 0.60m external to zone 1.

Zone 3: is limited to the vertical plane(s) external to zone 2 and the parallel vertical plane(s) 2.40m external to zone 2.

#### Products for bathrooms

First and foremost, Electrical equipment used in bathrooms must not be adversely influenced

that identify the products safety and suitability for bathroom use.

#### i) IP Ratings

Bathroom electrical equipment must carry an appropriate Ingress Protection (IP) rating for its location. The Wiring Regulations make specific mention of Ingress Protection ratings:

- Zone 0 requires equipment to carry a minimum IP rating of IPX7 – that equipment is protected against the effects of immersion
- Zones 1 and 2 equipment should carry a minimum IP rating of IPX4 (protection against splashing water) or IPX5 if water jets are likely to be used for cleaning.
- In Zone 3 while there is no designated IP requirement for equipment in this zone, again an IP rating of IPX5 is required if the area is cleaned with water jets.

#### ii) PELV and SELV

Equipment may also be described as a Protective Extra-Low Voltage (PELV) or Safety Extra-Low Voltage (SELV) product. PELV products use low voltage but are connected to earth. SELV products are again of low voltage, but the voltage supply output is double insulated from the input. This enables a SELV product to be used in any zone in the bathroom providing the source (e.g. transformer) is housed in Zone 3.

#### iii) CE & Safety Certified Products

All domestic electrical products sold in the EU are subject to the CE Marking regulations. The easiest way for a manufacturer to demonstrate their products' conformity with these is to provide evidence in the form of test work and certification for a product from an expert third party.

Because Safety certification for domestic electrical equipment is based on the successful completion of a full set of tests against the appropriate electrical standards and has the requirement for factory inspection and ongoing product surveillance, contractors can feel particularly confident in the continued safety of certified goods. Particularly, as these items have had to undergo specific test programmes related to their performance in damp and wet environments.

When specifiers and contractors are choosing products for a bathroom project, they should therefore look for the safety certification marks on products. In the UK two of the most common safety certification marks that you will see are the ASTA Diamond Mark and the BEAB Approved Mark.

#### The products

As well as looking for independent product safety certification marks, common sense and the wiring regulations further govern the choice of products.

#### i) Lighting

Many manufacturers do not get lighting products certified by a third party, but electrical contractors are required to look for an appropriate IP rated product (recommended IPX4 or above). If the luminaire has a cord pull switch and is compliant to BS 3676, these are not normally IP rated but can be installed in Zone 3. Some types of lights can be installed in Zone 0 (specifically for use in shower enclosures) but they must be 12V SELV.

#### ii) Showers & Instantaneous Water Heaters

Showers and water heaters should have an IPX4 rating or above.

When considering which electrical shower to safely install in a bathroom, contractors are also considering user safety. With rapid changes in water temperature common in showers, choosing equipment with appropriate thermostats and cut outs is particularly of benefit to the end user.

#### The BEAB Care Mark

Special mention should be made of a certification called the BEAB Care Mark. This unique certification is awarded to products that are designed with specific temperature controls to prevent scald injuries, particularly relevant to the old, young or those with limited mobility or reduced sensitivity to temperature change.

Products bearing the Care Mark already carry BEAB safety certification, but are particularly sought after by electrical contractors as they have also undergone additional testing and assessment of their temperature controls. Products carrying the CARE Mark include thermostatically regulated showers.

added dimension of safety to equipment.

Recent UK press coverage in national newspapers has highlighted calls from Members of Parliament to have thermostats and safety cut outs installed on bathtubs. The issue of user safety for water heating products is clearly being recognised at a well publicised government level and consideration of the issue by manufacturers could pre-empt legislation controls and show due consideration to users.

#### iii) Extractor fans

- If no other form of ventilation exists, an extractor fan with an IPX4 rating or higher should be installed in Zone 2 or above – but the SELV source must be located in Zone 3 or beyond. If restricted space makes this impossible, it is acceptable to locate a 230V IPX4 fan in zone 1, but a 30 mA Residual Current Device (RCD) must protect it.
- This type of fan can also be used in zone 2 but does not have to have the RCD protection
- Isolators should disconnect both poles. This means that where the fan has a timer trigger input a 3-pole isolator is required.

#### iv) Heaters

- Regulation 601-09-04 allows under floor heating under any zone, provided its covered by an earthed metallic grid.
- SELV supplied heating equipment can be used in Zone 1 but it is preferred to locate it in Zone 2.

#### v) Shaver Sockets

- Generally, shaver sockets won't have an IP rating, but if they comply with BS EN 61558-2-5 they can safely be installed in Zone 2 - as long as they are away from the bath or shower unit and are unlikely to come into contact with shower spray.

#### vi) Heated towel rails

- If lack of space requires a heated towel rail to be situated in Zone 2 it should have a rating of at least IPX4
- Heated towel rails are subject to BS EN 60335-2-43 (2003) which requires an IP rating of at least IPX1.

#### Portable Appliances

The lack of power sockets in bathrooms is intended to restrict the use of portable appliances like hair dryers.

However, if a bathroom is big enough to have an area outside of zone 3 then portable appliances are permitted in the bathroom but they must be plugged in outside the bathroom and their flex must not enable them to be used in zone 3. Similarly, if a user is likely to plug their appliance into a socket outside the bathroom in the hall or landing, the installer should try and position that socket far enough away from the bathroom that the likely length of flex on the appliance will not enable it to be used inside zone 3.

Simply reducing the length of a flex on a product could contribute to reducing the risk of a product being used in a bathroom - further ensuring the safety of end users.

#### Further reading

BS7671 the 'Requirements for Electrical Installations' - Section 601, 'Locations containing a bath or shower'.