IP Ratings

Bathroom IP Zones for wall fixed items

Within a bathroom there are a number of separate zones, and each zone has it's own specific requirements for the minimum IP Rating of any electrical items being installed into that area.

Zone 0 - Inside the bath or shower

Any items used within Zone 0 must be SELV (Separated Extra Low Voltage – max 12 Volts) and have a minimum IP rating of IPX7/IP67, protection against immersion in water/totally immersion proof. For showers without a basin, the height of Zone 0 is 0.1m and its surface extent has the same horizontal extent as Zone 1.

Zone 1 - Above the bath or shower to a height of 2.25m

Within Zone 1 a minimum rating of IPX4/IP44 is required and equipment must be listed in S 701.55 BS7671:2008 as suitable for use in this area. If there is a likelihood of water jets being used for cleaning purposes, a minimum of IPX5 is required. Subject to IP rating, SELV or 240V luminaires may be used in this zone; if the item is 240V a 30mA residual current device (RCD) must also be used to protect the circuit in this zone.

Unless the space beneath a bath tub or shower is only accessible with a tool, it is considered Zone 1. For showers without a basin Zone 1 extends for 1.20m from the centre point of the fixed water outlet.

Zone 2 - The area stretching to 0.60m outside the bath or shower and above the bath or shower if over 2.25m

An IP rating of at least IPX4 (IP44) is required for items in this zone. If there is a likelihood of water jets being used for cleaning purposes, a minimum of IPX5 is required. Subject to IP rating, SELV or 240V luminaires may be used in this zone. In addition, it is good practice to also consider the area around a wash basin as Zone 2 within 0.60m radius of any tap.

Outside the zones – anywhere outside zones 0, 1, and 2

Where water jets are not going to be used for cleaning purposes, the general rules of BS7671 apply.

IP Ratings of Heat Mat products

IP20 Rated	Ice and snow protection thermostats
IP21 Rated	NGTouch and NGT-567-0010 thermostats TPS thermostats
IP44 Rated	230V mirror heaters
IP54 Rated	External ambient air temperature sensors
IP57 Rated	External pipe and ground temperature sensors
IP65 Rated	Trace heating thermostats Trace heating junction boxes
IP68 Rated	Ground temperature and moisture sensors Gutter moisture sensors
IPX7 Rated	Undertile heating mats Undertile heating cables Underlaminate heating mats In-screed heating cables Condensate pipe heaters
IPX8 Rated	Internal water pipe trace heating
SELV Rated	Low voltage mirror heaters

Heat Mat
Underfloor Heating

Call 01444 247020 to find out more or visit our website at www.heatmat.co.uk

Product IP Ratings

- **Undertile heating mats and cables**
  IPX7 rated – suitable for use beneath any tile or stone floor in a bathroom, including directly beneath a shower head if the floor above is suitably waterproofed. Suitable for use beneath all zones.
- **Underlaminate heating mats**
  IPX7 rated – suitable for use beneath laminate or floating wooden floors in bathroom, but not suitable for use beneath shower enclosures. Suitable for use beneath Zone 2.
- **In-screed heating cables**
  IPX7 rated – suitable for use beneath any tile or stone floor in a bathroom, including directly beneath a shower head if the floor above is suitably waterproofed. Suitable for use beneath all Zones.
- **NGTouch, NGT and TPS thermostats**
  IP21 rated – suitable for use within bathrooms outside of Zones 1 and 2. Alternatively the thermostat can be installed on the outside wall of the bathroom and can operate on it's floor temperature sensor. A wireless version of the TPS thermostat is available with a battery powered wireless room and floor temperature sensor, which allows installers to avoid any mains Voltage sensors in the bathroom area. Only suitable for installation outside of all Zones.
- **Mirror heaters**
  IP44 rated - suitable for use behind mirrors in Zone 2. If a mirror is installed within Zone 1 SELV mirror heaters are available.

Solids, first digit

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts (e.g. electrical conductors, moving parts) and the ingress of solid foreign objects.

Level	Object size protected against	Effective against
0	—	No protection against contact and ingress of objects
1	>50mm	Any large surface of the body, such as the back of a hand, but no protection against deliberate contact with a body part
2	>12.5mm	Fingers or similar sized objects
3	>2.5mm	Tools, thick wires, etc.
4	>1mm	Most wires, screws, etc.
5	Dust protected	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment; complete protection against contact
6	Dust tight	No ingress of dust; complete protection against contact

Liquids, second digit

Protection of the equipment inside the enclosure against harmful ingress of water.

Level	Protected against	Testing for
0	Not protected	—
1	Dripping water	Dripping water (vertically falling drops) shall have no harmful effect.
2	Dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.
3	Spraying water	Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect.
4	Splashing water	Water splashing against the enclosure from any direction shall have no harmful effects.
5	Water jets	Water projected by a nozzle (6.3mm) against enclosure from any direction shall have no harmful effects.
6	Powerful water jets	Water projected in powerful jets (12.5mm nozzle) against the enclosure from any direction shall have no harmful effects.
7	Immersion up to 1m	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1m of submersion).
8	Immersion beyond 1m	The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer. Normally, this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects.

The summary information on this sheet is based on our interpretation of S701 of BS7671:2008. Heat Mat cannot be aware of conditions on site and each installation will be different which is why, in all cases, an appropriately qualified electrician must make the final decision on the suitability of equipment for installation based on the individual on site circumstances.

IP??? Rated

General overview of IP Ratings

An IP rating consists of the letters IP followed by two digits and an optional letter. As defined in the international standard IEC 60529, it classifies the degree of protection provided against the ingress of solids and/or liquids.

The first digit of the rating indicates the level of protection against access to hazardous parts by solids, ranging from tools or fingers to dust.

The second digit indicates the level of protection against moisture ingress and covers dripping water to total immersion in water.

Often an IP rating will replace the first digit with an X, where testing is not relevant for access by solid objects. An example of this is an undertile heating mat, which is not accessible to touch once it is installed.

Supplementary letters can be used after the first two digits of the IP rating to indicate protection of individuals against access to hazardous parts, or for specialist testing conditions.

An example of an IP rating is Heat Mat's NGTouch thermostat. Its IP21 rating confirms it is protected against insertion of fingers (IP2X) and it will not be damaged or become unsafe during a specified test in which it is exposed to vertically dripping water (IPX1).

About Heat Mat

With more than 1,200,000m² of underfloor heating installed, 20 years' experience of the UK underfloor heating market and a wealth of knowledge on Scandinavian ice and snow melting systems, you can rely on Heat Mat to understand your needs and supply the products to satisfy your requirements.

This is why we are the Professionals' Choice, the number one supplier of electric underfloor heating and ice and snow melting systems to the UK's professional installation market.

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