

Supplying Electricity To Hot Tubs And Spas

With the popularity of hot tubs and spas on the increase in the UK, the National Inspection Council for Electrical Installation Contracting (NICEIC) look at the design considerations for the electrical supply to them

The increasing use of hot tubs and spas, in both indoor and outdoor locations, has brought with it an increase in the number of questions posed about the safety requirements for the associated electrical installations.

The questions raised result from the need to know what particular requirements of BS 7671 should be applied to a given situation, and as the installation of hot tubs are not treated as special locations, the general requirements of BS 7671 apply; and it will be for the designer of the electrical installation to take due account of the increased risks associated with the installation of such equipment. For example, in addition to the general requirements, should the requirements set out in Section 701 (Rooms containing a bath or shower), Section 702 (Swimming pools and other basins) or both apply? This article addresses such questions.

INCREASED RISK OF ELECTRIC SHOCK

As with rooms containing a bath or shower, the indoor hot tub introduces an increased risk of electric shock due to the reduction in body resistance, particularly contact resistance, due to immersion, or partial immersion, in water.

For hot tubs and spas located outdoors, the risk of electric shock is further increased because contact with the general mass of Earth is likely. The reason for this is that under earth fault conditions, touch¹ voltages are increased due to persons being in contact with 'true' Earth – the ground.

INDOOR HOT TUBS AND SPAS

Where a hot tub or spa is placed in a location containing a bath or shower, the requirements of Section 701 have to be met. However,

¹Typically, 'touch' voltage is understood to be the difference in potential between the person in contact with the live source and the general mass of Earth. However, 'touch' voltage is the difference in potential between the person in contact with any two conducting parts: this could be between two lines of a three-phase supply, between a live source and earth or between line and neutral.



Where the hot tub, spa or swim spa is housed in a purpose-made shelter (not a gazebo type shelter) or enclosure, the most appropriate requirements to apply are likely to be those of Section 701

where a hot tub is located indoors, it may be placed in a room other than the bathroom.

Where a hot tub or spa is located in a room other than a bathroom, whether on the ground floor or elsewhere indoors, the location will be subject to similar electrical safety considerations as a bathroom. In such cases, the electrical installation designer may decide that the requirements of Section 701 should be applied in full.

SPAS IN SHELTERS AND ENCLOSURES

Where the hot tub, spa or swim spa is housed in a purpose-made shelter (not a gazebo type shelter) or enclosure, the location will be subject to similar electrical safety considerations as a bathroom, and the most appropriate requirements to apply are likely to be those of Section 701.

Where the hot tub, spa or swim spa is an 'open-air' type, the location falls within the scope of Regulation 702.11 (basins of swimming pools, fountains and paddling pools, and their surrounds). The requirements of Section 702 should, therefore, be applied in full for this type of installation.

OTHER HOT TUB AND SPA TYPES

Where a hot tub or spa does not fit into either of the categories previously described, the electrical installation designer must use engineering judgement in applying the relevant requirements. Electrical equipment should be suitable for the particular external



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influences likely to exist at its point of installation, and any additional measures considered necessary for protection against electric shock should be deployed. For example, as cited in the note to Section 415, additional protection in accordance with Section 415 may be specified with the protective measure under certain conditions of external influence and in certain special locations. This may include:

- protection by an RCD with a residual operating current not exceeding 30 mA and/or
- supplementary bonding.

Another measure of protection against electric shock which may be used is separated extra-low voltage (SELV) meeting the requirements given in Sections 701 and/ or 702 of BS 7671.

The relevant requirements of BS 7671 need to be complied with so that the degree of electrical safety is not less than that afforded in a location containing a bath or shower, or a location containing a swimming pool.

The installation of hot tubs, garden spas, and other similar equipment raises a series of electrical installation design considerations that must be addressed before any request for supply to be made available for their installation. **SPN**

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