

Waterproofing:

BS 8102: 2009 Code of practice for protection of structures against water from the ground, gives three categories of waterproofing for a basement:

Type A - Tanking

A continuous waterproof barrier is applied to the inside or outside of the basement structure.

Type B - Structurally integral protection

Usually water resistant concrete in combination with a waterproof membrane.

Type C - Drained cavity

Cavity Drainage Membrane is applied to the internal walls and floor to collect and drain away water entering the basement.

Heat loss

The pattern of heat loss from a basement wall is complex, with the rate of heat loss diminishing as the depth of the basement increases. This is due to the insulation value of the ground behind the basement wall. A method for calculating U-values for basements is given in BS EN ISO: 13370.

Position of insulation

Installing rigid insulation externally is the preferred method for insulating new basement walls.

Internal insulation of basement walls is only recommended for existing basements where it is not possible to insulate the basement externally.

Type of Insulation:

100% Closed Cell Extruded Polystyrene and other performance insulation materials (i.e. Foamglass) - are the only recommended products because they have negligible moisture absorption and high compression resistance.

Externally insulated

External insulation is the preferred option for basements as the whole structure is kept warm, with negligible risk of condensation. The insulation should be placed up against the waterproofing membrane. Only high performance insulation materials which are highly resistant to water absorption and the passage of water vapour are recommended because it has negligible moisture absorption and high compression resistance. A drainage membrane or layer of washed no fines gravel should be placed adjacent to the insulation. This relieves hydrostatic pressure and channels water to the foundation drain. The membrane or gravel should be covered with a geotextile to prevent fines from blocking the drainage material.

Other considerations

The land around the building should slope away from the basement walls. Ideally the area adjacent to the building should have an impermeable finish, such as concrete paving. For new basements, a drain should be located around the perimeter of the basement and positioned at least 200mm below the finished level of the basement floor. It should be bedded and surrounded in free draining aggregate and wrapped in a geotextile before backfilling, to prevent fines from blocking the drain.

Internally insulated

Internal insulation is applied to existing basements where it is not possible to insulate the basement externally. Any insulation system applied to the interior of the basement should have the following properties:

- It must allow the basement wall to dry out to the inside, for

example by means of a cavity drainage system

- It must prevent warm moist air reaching the cold basement wall and condensing.

A vapour control layer (vcl) should always be installed on the warm side of the insulation to prevent water vapour from the basement rooms condensing on the cold cavity drainage system. All joints, tears, overlaps and perforations in the vcl should be well sealed with an aluminised tape.

Basement Walls:

100% Closed Cell insulation and other performance insulation materials, such as Foamglass are ideal for insulating internal basement walls. Closed cell insulation materials won't absorb moisture, lose U-value, support mould growth, compress or fall out of place. 100% Closed Cell Extruded Polystyrene and other performance insulation materials are available in various thicknesses and can be fixed with adhesive or fasteners or within an internal freestanding frame to form internal dry-lined walls.

Existing Floor Slabs:

A Type C basement waterproofing system may use compacted insulation laid over an existing flat solid floor slab or raft. This also acts as a spacer for the perimeter drainage channel and other floor drains to ensure that the floor cavity membrane is at the correct height and above the drainage channels. 100% Closed Cell Extruded Polystyrene or other performance insulation materials are used as a spacer over floor slabs. Vapour barriers and membranes should be incorporated within the floor build in accordance with Building Regulations. Any membrane used must be covered or protected with a ballast/floor finish material

Insulation in Basements

such as sand and cement screed, floor tiles, paving slabs or timber/particle board flooring.

The correct material specified must be highly resistant to water absorption and to the passage of water vapour. If the insulation cannot absorb water, it will maintain its insulated value. Saturated insulation is a good conductor of heat and therefore a poor insulator.

DONTS!

Do not use 'ordinary' sheet polystyrene, fibreglass or mineral wool insulation in basements because of its widespread availability and low cost. It doesn't take long for the moist conditions in a basement to cause problems with this type of insulation. These materials absorb moisture, they lose their insulating value, compress, grow heavy from water weight and often fall out of place. By retaining moisture, the insulation promotes the growth of mould. This is especially true when the insulation has a paper facing. Mould not only creates unpleasant smells but can be a health hazard.

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This is a guidance note. Where recommendations are made for specific tasks, these are intended to represent 'best practice', i.e. recommendations that in the opinion of the PCA meet an acceptable level of competence. Although members are not required to follow the recommendations contained in the note, they should take into account the content.

The information contained in this leaflet is given in good faith and believed to be correct. However, it must be stressed that of necessity it is of a general nature. The precise condition may alter in each individual case and the Association is therefore unable to accept responsibility for any loss howsoever arising from the use of the information contained herein.

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