

## Underfloor heating systems

### Zoning and controls

- 6.28** New underfloor heating systems should meet all of the following, in addition to the general requirements for heating and hot water systems in Section 5.
- All underfloor heating systems should have controls to adjust the operating temperature.
  - Room thermostats for electric underfloor heating systems should have a manual override.
  - Heating systems for screed floors that are greater than 65mm thick should automatically reduce the room temperature at night or when the room is unoccupied.
  - Heat loss should be minimised by following the guidance in paragraphs 6.29 to 6.32.

### Minimising heat losses

- 6.29** Ground floors and those in contact with the outside of the **dwelling** should be insulated to limit heat losses to not more than 10W/m<sup>2</sup>. The heat loss from the floor should be calculated using the sum of the thermal resistance of the floor finish and the underlying heated layer, multiplied by 10.
- 6.30** Underfloor heating systems intended for intermittent or cyclical operation and/or installed over unheated rooms should be separated from the structural floor by a layer of insulation with a thermal resistance of at least 1.25(m<sup>2</sup>·K)/W.
- 6.31** The **intermediate floor** should have a layer of insulation to reduce downwards heat transmission with a thermal resistance of one of the following.
- The performance in paragraph 6.29.
  - As specified in **BS EN 1264-4**, as follows.
    - For electric systems, not less than 0.5(m<sup>2</sup>·K)/W.
    - For wet systems, not less than 0.75(m<sup>2</sup>·K)/W.
- 6.32** Distribution pipework which does not provide useful heat to a room should be insulated to the standards detailed in paragraph 4.26.

### Specific standards for electric underfloor heating

- 6.33** Electric cables for underfloor heating should be installed within screeds as follows.
- For direct electric systems, within screeds not exceeding 60mm.
  - For night energy storage systems, within screeds of at least 65mm.
- 6.34** Where electric cable underfloor heating night energy storage systems are used, both of the following should be met.
- A minimum of 20% of the floor area of the **dwelling** should have fast-response systems, such as panel heaters.
  - Controls should be installed which modify the input charge in response to both of the following.
    - The room thermostat.
    - Floor temperature sensing.

**6.35** Programmable room thermostats with an override feature should be provided for all direct electric zones of the electric underfloor heating system. Thermostats should have air and floor temperature sensing capabilities which may be used individually or in combination.

## Heat pump heating systems

**NOTE:** For heat pumps that provide comfort cooling, guidance is also given in paragraphs 6.49 to 6.53.

- 6.36** Electrically driven air-to-air heat pumps with an output of 12kW or less should follow the Ecodesign Commission Regulation No. 2016/2281 for air heating products, cooling products, high temperature process chillers and fan coil units.
- 6.37** For other types of heat pump, not defined in paragraph 6.36, the **coefficient of performance** should be both of the following.
- For space heating, a minimum of 3.0.
  - For heating domestic hot water, a minimum of 2.0.
- 6.38** The heat pump unit should include controls for all of the following, in addition to meeting the general requirements for heating and hot water systems in Section 5.
- To control water pump operation (internal and external, as appropriate).
  - To control either of the following.
    - For wet systems, water temperature.
    - For air systems, air temperature.
  - For air-to-water and air-to-air units, to control outdoor fan operation.
  - For air-to-water and air-to-air systems, to provide a defrost control for the external air-side heat exchanger.
  - For air-to-air systems, to control **secondary heating** (if fitted).
  - To protect against water flow failure.
  - To protect against high water temperature.
  - To protect against high refrigerant pressure.
  - For air-to-water and air-to-air units, to protect against air flow failure.
- 6.39** The heat pump should have external controls that include both of the following.
- Weather compensation** or internal temperature control.
  - Timer or programmer for space heating.
- 6.40** For heat pump installations in which there are other heat sources available to the same building, each of these heat sources should be appropriately incorporated into a singular control system.
- 6.41** Heat pumps should be located and installed subject to the manufacturer's guidance. In regard to air source heat pumps, this includes the consideration of factors that may adversely affect their performance, e.g. the avoidance of cold exhaust air recirculation and the removal of condensation from the outdoor coil during a defrost cycle.
- 6.42** Heat pumps should not be sited adjacent to sleeping areas, nor should they be located on materials that can readily transmit vibrations. Additionally, the location of external fans and heat pump compressors should be appropriately selected to minimise disturbance to neighbours, while remaining in compliance with planning requirements.