

5.5 SPACE HEATING DESIGN

55.1 For systems delivering space heating, the following procedure shall be followed for the correct sizing and selection of a heat pump and related components for each installation:

- a) A heat loss calculation should be performed on the building using internal temperatures not less than those specified in Table 1 and external temperatures specified in Table 2 column A or B, according to the MCS Contractor's assessment of the building location. If column B is selected no uplift factor for intermittent heating is required. Heat loss calculation shall in other respects comply with BS EN 12831-12017.
- b) Any supplementary electric heater shall be designed to not operate above the external temperatures in Table 2.
- c) When calculating the heat loss through a solid floor in contact with the ground, the temperature difference to be used is the internal design room temperature (Table 1) minus the local annual average external air temperature (see MGD 007 Section 5)
- d) When calculating the heat loss through a suspended floor, the temperature difference to be used is the internal design room temperature (Table 1) minus the design external air temperature (Table 2).
- e) A heat pump should be selected that will provide at least 100% of the calculated heat loss taking into consideration the flow temperature at the heat pump and without input from any supplementary electric heater. Performance data from both the heat pump manufacturer and the emitter system designer should be provided to support the heat pump selection.
- f) An air source heat pump system should be able to maintain the internal design temperatures across multiple defrost cycles.
- g) Where clauses e) or f) cannot be met then clause 5.5.2 shall apply.

Note: an example of where e) or f) cannot be met would be if the building has insufficient electrical supply for the heat pump to meet 100% of the calculated heat loss.

5.5 SPACE HEATING DESIGN

Systems shall be designed in compliance with either clause 5.5.1 or 5.5.2.

5.5.1 For **heat pump** systems delivering **100%** space heating with **or without a supplementary electric heater**, the following procedure shall be followed for the correct sizing and selection of a heat pump and related components for each installation:

- a) A heat loss calculation should be performed on the building using internal temperatures not less than those specified in Table 1 and external temperatures specified in Table 2 column A or B, according to the MCS Contractor's assessment of the building location. If column B is selected no uplift factor for intermittent heating is required. Heat loss calculation shall in other respects comply with BS EN 12831-12017.
- b) Any supplementary electric heater shall be designed to not operate above the external temperatures in Table 2.
- c) When calculating the heat loss through a solid floor in contact with the ground, the temperature difference to be used is the internal design room temperature (Table 1) minus the local annual average external air temperature (see MGD 007 Section 5).
- d) When calculating the heat loss through a suspended floor, the temperature difference to be used is the internal design room temperature (Table 1) minus the design external air temperature (Table 2).
- e) A heat pump ~~should~~ **shall** be selected that will provide at least 100% of the calculated heat loss taking into consideration the flow temperature at the heat pump and without input from any supplementary electric heater. Performance data from both the heat pump manufacturer and the emitter system designer should be provided to support the heat pump selection.
- f) An air source heat pump system should be able to maintain the internal design temperatures across multiple defrost cycles.

~~g) Where clauses e) or f) cannot be met then clause 5.5.2 shall apply.~~

~~Note: an example of where e) or f) cannot be met would be if the building has insufficient electrical supply for the heat pump to meet 100% of the calculated heat loss.~~

Original clause 5.5 in MIS 3005-D

5.5.2 Where other heat sources are available to the same building then

- a) The combined output of all heat sources shall be not less than 100% of the calculated heat loss
- b) All heat sources intended to supply 100% of the calculated heat loss, including the heat pump, shall be fully and correctly integrated into a single control system.

Note: the control system should preferably prioritise the source of heat which causes the lowest carbon emissions.

- c) It shall be clearly stated in the contract what proportion of the building's space heating and domestic hot water has been designed to be provided by the heat pump (excluding any heat supplied by a supplementary electric heater) taking into account the heat emitter circuit and flow temperature.

NEW Proposal to MIS 3005-D

5.5.2 For the purposes of this clause, a "hybrid heat pump system" is one which incorporates a heat pump and an alternative heat source, commonly a fossil fuel boiler, and where both are operated and controlled by a single master controller which is capable of operating both devices simultaneously or independently depending on operating conditions. **For heat pump systems delivering space heating where other alternative heat sources are available to the same system**, the following procedure shall be followed for the correct sizing and selection of a heat pump and related components for each installation

- a) A heat loss calculation should be performed on the building using internal temperatures not less than those specified in Table 1 and external temperatures specified in Table 2 column A or B, according to the MCS Contractor's assessment of the building location. If column B is selected no uplift factor for intermittent heating is required. Heat loss calculation shall in other respects comply with BS EN 12831-12017.
- b) When calculating the heat loss through a solid floor in contact with the ground, the temperature difference to be used is the internal design room temperature (Table 1) minus the local annual average external air temperature (see MGD 007 Section 5).
- c) When calculating the heat loss through a suspended floor, the temperature difference to be used is the internal design room temperature (Table 1) minus the design external air temperature (Table 2).
- d) The combined output of all heat sources shall be not less than 100% of the calculated heat loss. **The Heat Pump proportion of the system shall be selected that will provide at least 55% kW of the calculated heat loss from 5.5.2 (a) at the rated condition of 55°C flow at the design external temperature. Performance data from both the heat pump manufacturer and the emitter system designer should be provided to support the heat pump selection.**
- e) **The control strategy shall be capable of prioritising heat pump utilisation and minimising the contribution from the alternative heat source.**
- f) **All Combined** heat sources intended to supply 100% of the calculated heat loss, including the heat pump, shall be fully and correctly integrated into a single **master control system capable of operating both devices simultaneously or independently depending on operating conditions to create a single heating system.**

~~*Note: the control system should preferably prioritise the source of heat which causes the lowest carbon emissions.*~~

- g) It shall be clearly stated in the contract what proportion of the building's space heating has been designed to be provided by the heat pump (excluding any heat supplied by a supplementary electric heater) taking into account the heat emitter

circuit and flow temperature. It shall also be clearly stated in the contract what proportion of the buildings domestic hot water has been designed to be provided by the heat pump excluding any heat supplied by a supplementary electric heater).