

University of Cambridge

Policy on Thermal Comfort

The University aims to provide a comfortable working environment for staff and students, and to comply with Health and Safety requirements while minimising carbon dioxide (CO₂) emissions and costs arising from the operation of heating systems.

Heating season

During the heating season, which usually starts in September and ends in May, the University aims to maintain internal temperatures in buildings within the range of 19 to 21°C. Lower temperatures may apply in areas where work is non-sedentary in nature or where a process or activity in the space requires a lower temperature. Estate Management (EM), in liaison with the Schools and/or the Registry shall determine start and end dates for the heating season and these will be made available on the EM website.

Outside of the heating season, should internal space temperatures drop dramatically due to abnormal weather EM will actively monitor conditions and consider if the main heating systems should be switched on. The decision-making process will balance factors including internal temperatures, availability of heating systems (which are maintained during the summer and are not always available), the weather forecast and cost/environmental impacts. In some mechanically ventilated spaces, heating may be required to control the temperature of air flows at acceptable levels, even if the heating to radiator systems remains off.

Heating times

The University aims to maintain internal temperatures in buildings within the range of 19 to 21°C during their core operational hours.

Heating, Ventilation and Air Conditioning (HVAC) systems in each building are controlled by a sophisticated Building Management System (BMS). The BMS detects both internal and external temperatures and, based on previous performance, calculates the appropriate time to switch systems (boilers, pumps etc.) on in order to achieve the temperature setpoint by the start of the occupancy period. The BMS also performs a range of other functions including frost protection of buildings/plant and switching off radiator systems when external temperatures exceed 16°C

Out of hours heating requests, e.g. for evening/weekend events, should be made to the EM Maintenance Unit in order that the BMS can be programmed. To prevent inefficiency, wherever possible, out of hours use will be restricted to a limited number of buildings.

Thermal comfort

Human perception of a comfortable temperature is subjective. It is based on a combination of factors including; air temperature; radiant temperature; humidity; individual metabolism and clothing. It is recognised that not everyone will achieve 'thermal comfort' at 19-21°C and it is expected that occupants will moderate their own comfort by dressing appropriately for their preference. It is also recognised that personal comfort can depend on building design and room layout, for example the relationship between desk and heat source locations or windows. Such considerations should be borne in mind when plans are being made to change the layout of a building or the rooms within it. This is particularly true if such changes involve the construction or removal of walls, partitions or other physical aspects which can affect the flow of air within and around the building.

Where local heating controls e.g. thermostatic radiator valves, are provided, it is expected that occupants will manage these in such a way that internal temperatures reach 19-21°C. Windows and doors should be closed during the heating season.

Health and Safety legislation

The Workplace (Health Safety and Welfare) Regulations 1992 Approved Code of Practice states that temperature in workrooms should provide reasonable comfort and goes on to specify that this should normally be at least 16°C for sedentary work and 13°C for manual work.

Electric heaters

Electric heating is expensive, environmentally damaging due to high CO₂ emissions from power stations, and can pose a significant fire risk.

However, outside the heating season, in circumstances where internal temperatures are shown to be below 19°C for a significant period, temporary heating may be appropriate. Any temporary electric heaters must be Portable Appliance Tested, and should be thermostatically controlled oil-filled radiators. Departments should liaise with EM Maintenance to ensure that any temporary heating can be operated safely, for example to prevent overloading of local electrical circuits. For safety reasons electric heaters must not be left switched on in unoccupied rooms and should not be left on out of hours under any circumstances.

Using electric heating during the heating season adversely affects BMS control of building systems. As thermostats detect high temperatures caused by the heaters, heating to potentially large areas may be shut down, affecting many building users and leading to complaints, inefficiency and high costs. The use of electric heaters during the heating season is therefore not permitted except in exceptional circumstances, e.g. a failure of the main heating systems.

Requests for additional supplementary heating for health or other specific reasons must be approved by the Head of Department and Building Manager. Individuals are not permitted to bring in/purchase their own local heaters and, if found, these may be removed during routine health & safety inspections.

Comfort cooling and air conditioning

In general full air conditioning or local cooling is not the standard throughout the University Estate where it is solely installed for the general comfort and wellbeing of individuals or any group of individuals during the 'summer' period. Air conditioning or local cooling may only be installed if:

- It is required by regulation or enforceable code of practice (e.g. Home Office Scientific Procedures), or
- There is a specific identifiable academic need (such as chemical deterioration at elevated temperatures), or
- Excessively high internal space temperatures are likely to be experienced and there is no other practicable means of reducing heat gains. (In this context "practicable" will include natural ventilation, local ventilation, thermal store or passive solar measures such as shading, orientation and high structural mass).

Where comfort cooling is provided it will be subject to control by Estate Management in the same way as the centralised heating systems. If this is not technically feasible then departments will need to ensure that the cooling is not used profligately.

Current national design guidelines (*CIBSE Guide A: Environmental Design*) suggest 25°C as an acceptable summer indoor design operative temperature for non-air-conditioned office buildings

providing the expected occurrence of operative temperatures above 28°C is limited to 1% of the annual occupied period. It is recognised that between 25°C and 28°C, increasing numbers of people may feel hot, uncomfortable and show lower productivity. Indoor operative temperatures that stay at or over 28°C for long periods of the day will, except during prolonged hot spells, result in dissatisfaction for many occupants. Good practice ways to reduce discomfort for occupants of office buildings in hot summer conditions when indoor operative temperatures rise above 25°C include:

- relaxation of formal office dress to encourage individual adaptation to conditions
- individual control over the thermal environment, where practicable, such as by opening windows, the use of blinds, or moving out of sunny areas
- flexible working so people can work at more comfortable times
- availability of hot or cold drinks
- increased air movement; e.g. the cooling effect of local fans can be equivalent to reducing the operative temperature by around 2°C
- controlling or eliminating appliances that contribute to heat gains within the indoor environment, such as drying ovens, steam baths and IT equipment.

As with thermal comfort during the heating season, it is recognised that building design and room layout, for example the relationship between desk and heat source locations or windows, can play a role. Such considerations should be borne in mind when plans are being made to change the layout of a building or the rooms within it. This is particularly true if such changes involve the construction or removal of walls, partitions or other physical aspects which can affect the flow of air within and around the building.

Reporting heating faults

All heating faults and issues should be reported to the Maintenance Unit Helpdesk:

Tel: (3)37784

Email: MUHelpdesk@admin.cam.ac.uk.

Policy Review

This Policy was agreed by the following committees of the University:

Buildings Committee on 25th September 2013

Planning and Resource Committee on 4th December 2013

Full Council on 20th January 2014.