

**Space Heating and Ventilation**

**Code of Practice**

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| ISSUE NO | DATE REVISED | ITEMS CHANGED |
| 1 |  | Original Document |
| 2 | March 2020 | 1. Thermal Comfort defined 2. New air conditioning request procedure 3. Adjustments to main sections due to baseline review. |
| 3 | May 2020 | Addition of benefits/ reasons of set points. |
| 4 | Sept 2020 | Additions/ adjustments in line with Covid requirements |

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# Introduction

This code of practice has been developed in support of the Aston University Energy and Water Management Policy. The University has a Sustainability Strategy that states we will support regional emissions targets of zero carbon by 2030.

Mechanical ventilation, heating and comfort cooling/air conditioning is an energy intensive process and expensive to install, often requiring internal ductwork, diffusers, external wiring, controls etc. The University is legally required to inspect all air conditioning installations and there is also a high maintenance requirement for these systems. Additional costs for energy consumption and legislative compliance must be met by the University. The University also has a duty to provide an internal environment that is conducive to the work being carried out.

The aspects and procedures described within this document support the University reducing its energy usage, emissions as well as mitigating costs increases.

# Background of the control system

The majority of heating and ventilation systems within buildings on campus are controlled and monitored by a Building Energy Management System (BEMS), which is programmed by Estates & Capital Developments (ECD) to operate flexible heating and ventilation time periods to match different occupancy patterns. Outside of core occupation times, all buildings default to a frost and condensation control temperature or an out of hour’s schedule.

Control and monitoring of heating and ventilation is achieved by utilising data from a very large quantity of sensors which are installed into controlled spaces (rooms), duct work and individual systems. Data is continually sent back to a central computer for processing. The BEMS will generate alarms if control parameters are not maintained; these alarms will be investigated by E&CD staff.

The BEMS can be set to record a historical log of various parameters relating to heating and ventilation, and some parameters are recorded routinely. In addition to the BEMS, portable temperature data loggers and other instrumentation are routinely used to record data as required.

Heating time schedules are agreed with the principal users of the buildings and represent the best possible balance between the need to provide comfortable working conditions and the requirement to conserve energy and avoid waste.

In some areas, users have control of radiators through adjustment of a thermal radiator valve (TRV) and/or control of mechanical systems using a thermostat within the room. In most cases these are limited to provide temperatures +/- 2 degrees of 21oC. Please note with a number of ventilation systems, there isn’t comfort cooling and they will only provide fresh air.

**Benefit -** A properly functioning BEMS should deliver energy efficiency savings in the order of 15-20%. This equates to around £320,000 that is saved on the University’s electricity and heating costs.

# Thermal Comfort

Thermal comfort can be very subjective to each individual so please appreciate that your view of an acceptable temperature may not be the same as other users of the building. The following are areas that can improve your thermal comfort:

1. Use doors and windows appropriately during winter and summer to either retain or expel heat.
2. Ensure radiators and convectors are not blocked with furniture, clothing, towels etc.
3. Ensure radiator valves are set midway to reduce overheating and cold spots.
4. Dress appropriately to the thermal conditions outside and in, with access to additional layers of clothing if necessary.
5. Take regular breaks from your workplace to visit warmer/cooler areas.

Report perceptions of over/under heating to the Estates Helpdesk on ext 4000 or [estates\_helpdesk@aston.ac.uk](mailto:estates_helpdesk@aston.ac.uk)

Once the space has been assessed by ECD, departments can purchase cooling fans and evaporative coolers through ECD. It should be noted that as cooling fans only provide comfort cooling and do not actually reduce space temperature they should not be left on in a room unoccupied.

In a number of occasions management changes are required to improve one’s thermal comfort such as moving desks. This is a management decision and Estates and Facilities will only advise this as a solution in some cases.

To maintain levels of thermal comfort, Estates & Facilities will:

1. Aim to heat and cool buildings to the standards outlined in this document.
2. Investigate complaints of over and under heating promptly and provide suitable feedback.
3. In instances where heating and cooling standards are met and thermal discomfort is still perceived (e.g. due to drafts), Estates & Facilities will examine the feasibility of making improvements to the area. However, especially in older and listed buildings, options may be limited and physical limitations may prevent their adoption.

**Benefit –** The above makes heating set points impartial, lets users adjust their space to their preferred comfort as well as supports good wellbeing practices. Turning the temperature up high on your radiator valve does not warm the room up quicker.

# Heating and cooling general output specification

The following is specified outputs to provide adequate conditions within buildings:

* The University will heat buildings between 08:00 to 17:00 Monday to Friday.
* The heating of workspaces (e.g. offices, lecture theatres, seminar rooms, libraries and laboratories) will be set to meet between the range 19-21°C.
* Exceptions include circulation areas that are set to a minimum 16ºC.
* Specialised laboratory temperatures will be agreed on with their users.
* For areas where comfort cooling, systems will aim to maintain a minimum internal temperature of 25°C, where tempered air will cool the space. This setting is recommended in Carbon Trust and BRE energy guides and includes all computer rooms and meeting rooms.

**Benefit –** Heating use increases by around 8% for every 1°C increase. This is a potential increase of £45,000. Therefore, it is critical to heat to the temperatures stated above in order to reduce energy and emission.

The actual shutdown date of heating systems is decided according to local temperatures. In all buildings heating systems turn on or off automatically according to outside air temperatures.

The use of portable heaters is prohibited due to their high running costs and risks they pose to building electrical circuits, malfunctioning of primary building heating systems and fire. Electricity costs three times if not more compared to gas fueled systems. On this basis, the University would rather fix and adjust the buildings heating systems to meet required temperatures then have portable heaters. Secondly, portable heating only provides heat to the surrounding area and not the entire space. Finally, portable heaters have the potential to trick building temperature sensors and turn off heating to other areas of the building.

Approved portable heaters can be provided by Estates and Capital Developments should the primary building heating system fail. Owners of any portable heaters will be asked to remove the heater and if this is not completed within one week of the request the heater will be removed and disposed of. Departments are not permitted to purchase any portable heaters, and all requests for additional heating must go through the heating complaint procedure route.

**Benefit –** Research shows that cooling spaces at 25°C instead of 22°C, an average of 29% of cooling energy and 27% total ventilation systems energy savings are achieved. It’s difficult to fully quantify this for every mechanically cooled space in the University as regards to costs. However, as an example, an Aston University building of 500 m2 that is cooled through an electric mechanical systems (between May – September), spends £2.30 per m2 to cool the space or £1,146. An increase of 27% to this system would increase the costs to £1,455.

# Out of Hours Heating

In general, the University does not provide out of hours (weekend/evening) heating for academic and office areas. However, out of hours heating can be requested for the majority of our lecture theatres either via our Event Form [www2.aston.ac.uk/staff/marketing/events](https://www2.aston.ac.uk/staff/marketing/events) or if booking a space out of hours for academic requirements:

<http://www.aston.ac.uk/about/estates/how-to/book-a-room/>.

The University does not provide out of hours heating for student societies.

# Heating complaint procedure

For a **staff** member, if an individual is of the opinion that the space temperature is not being maintained, as described above, then a **request should be made to an individual’s line manager**. They need to ascertain if the heating complaint is genuine and if the work necessarily needs to be done at work, and cannot be achieved through agile working. If so, they will need to report the issue/ request to the Estates Helpdesk.

For a **student,** they should state their issue with either their course advisor, the lecturer if within a teaching space or the building operator e.g. Library staff.

Someone from the Estates Maintenance Team will take temperature readings of the space and in some cases a temperature data logger will be left to track the room’s temperature profile over a longer period of time.

If temperatures are not being met then either a supplementary heater will be provided for a small area i.e. a single office or a number of short term solutions will be implemented, whilst a long term solution is investigated.

These include:

* stopping any draughts from windows;
* bringing the heating on early to the area/ building especially on a Monday; and/or
* Increasing the flow rate temperatures to the area/ building.

All of the above will still only be implemented to meet the required temperature range.

If the individual is not happy with the outcome they can ask their line manager to escalate the complaint to the Estates Engineering Manager (or the Energy and Sustainability manager in their absence) who will determine the final outcome.

If an individual is requesting a heater due to working out of hours/ weekends, then a heater will not be given unless their line manager can highlight that such work is necessary during these times. Alternative arrangements for individuals who are affected may need to be considered by managers, please contact the Estates Helpdesk for advice.

# Emergency Cover

We have a Shift Engineer on site 0600 to 1900 Monday to Friday and 0800 to 1600 on Saturday and can be contacted via the Estates Helpdesk Monday to Friday or through Security on Saturdays. If there is a heating or ventilation issue out of these hours please contacted the **Security Office in the Main Foyer or on ext 4803.** Security will call the On Call Manager to detail the issue.

The Shift Engineer can turn individual systems on or off as required, in addition they will investigate faults and rectify if possible.

# Air conditioning

The University does not specify air conditioning/comfort cooling unless it can be shown that there is an unavoidable design or operational requirement that makes natural or mechanical ventilation unsuitable. Recirculation systems will not be used due to high risk of spreading a pandemic virus. Fresh air and other circulation systems will be used when necessary and these will be managed by air quality parameters (oxygen and CO2 levels).

Cooling systems use significantly more energy and therefore, contributing to higher emissions and running/maintenance costs. Before any air conditioning/comfort cooling solution shall be considered, natural or mechanical ventilation solutions shall be fully exhausted.

Refrigeration plant and equipment for any cooling purposes will be considered for the following scenarios:

1. Rooms requiring close control ambient temperature for academic purposes (Process).
2. Academic equipment requiring chilled water distribution for direct water-cooled purposes (Process).
3. Estates and Facilities will investigate areas where the combined heating effects (solar gain, people, PCs, lights, equipment etc.) cause the temperature to rise above 24oC consistently over a period of two weeks.
4. Food Storage.
5. IT Server/communication rooms.

In respect to item 3 above, as a general rule the University will not consider air condition/comfort cooling for office spaces (thermal comfort).

All proposals to install new comfort cooling or temporary cooling fans and condensing units will require a formal application to the Estates and Capital Development department.