

DIRECTORATE OF ESTATES AND FACILITIES

PROCEDURE AND INFORMATION MANUAL

EPM PM22: Air Conditioning/Comfort Cooling Policy

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Summary of Changes

1. Document now numbered as EPM PM22 due to duplication (previously EPM PM16).
2. Policy now available for download on CSU website.
3. The document has been fully rewritten and includes formal application form (appendix1).

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1.0 Background

Most of the University's operations are not temperature sensitive and very hot conditions are atypical, and in many cases air conditioning/comfort cooling is installed as a reaction to periods of short-term hot weather. The workplace (health, safety and workplace) regulations 1992 do not specify a maximum workplace temperature.

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 over 12kW as required by the Energy Performance of Buildings Regulations. There is also high maintenance requirement for each item of air conditioning plant. Additional costs for energy consumption and legislative compliance must also be met by the University.

This policy supplements the University's strategic goal to reduce energy consumption by 40% in 2020 and is a method of controlling, managing and monitoring the number of comfort cooling and air conditioning installation across the University Estate.

2.0 Policy

The Directorate of Estates and Facilities mandate that it is policy not to 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. The requirement to install air conditioning/comfort cooling systems should, in the first instance, be designed out by the correct utilisation and layout of the space. Before any air conditioning/comfort cooling solution shall be considered, natural or mechanical ventilation solutions shall be fully exhausted. This philosophy shall be employed by all mechanical designers and associated project team members (i.e. Architects, Surveyors etc) early on in the design stage (RIBA stage 1 and 2) of all new builds and refurbishments.

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. Where the combined heating effects (solar gain, people, PCs, lights, equipment etc.) cause the temperature to consistently rise above 28°C and all other options have been exhausted (**Thermal comfort**).
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 air conditioning equipment will require a formal application to the Mechanical and Energy team. Please refer to section 3 for more details on application requirements.

2.1 Thermal Comfort

In respect to perceived overheating associated with thermal comfort, the calculation methodology for assessing overheating shall be in accordance with current CIBSE guidance

TM 52. It is acknowledged within CIBSE TM 52 that BS 15251 is currently the best methodology for calculating overheating. Whilst any application for overheating in respect to thermal comfort will likely be rejected, any application shall require calculation assessment as per this guidance. A comparison calculation as per CIBSE (Chartered institute of building service engineers) Guide A 2006 shall also be provided.

On the rare occasions where air conditioning/comfort cooling is approved for thermal comfort it is mandated that the activation set point for cooling should be at 28°C. This will avoid excessive cost of operation and to reduce energy/carbon consumption. It is a requirement that all approved installations shall be connected, controlled and monitored by the University's BMS (Building Management System) system. Local room controllers shall not be permissible for use as the master control for room temperature. This arrangement will minimise energy/carbon consumption.

For calculated summertime temperatures in the region of 25 - 28°C, users shall be expected to following guidance as laid out in CIBSE (Chartered institute of building service engineers) TM52. This will consist of the following steps :

1. Relaxation of formal dress to encourage individuals to adapt to the conditions
2. Flexible working so people can work at more comfortable times.
3. Individual control over the thermal environment, where practicable, such as operable windows, using blinds or moving out of sunny areas.
4. Availability of hot or cold drinks
5. Increased air movement (e.g. local desk fans or opening windows).

Where an AC application associated with thermal comfort cooling is rejected and the method of introducing cooling is via new air handling plant, space shall be provided within the AHU for the future installation of cooling coils and associated condensing equipment.

2.2 IT Server/Communications Room

A formal AC application is required for all cooling systems associated with IT/Communications. The operational set point for any approved cooling for IT/Communications rooms should be 26°C as per the University's structured cabling specification December 2017. The primary method of control shall be provided via the University's Building Management System (BMS). The BMS controls shall override any installed manufacturers LCD controllers to minimise energy/carbon consumption and stop local temperature abuse. See appendix 2 which shows a typical DX cooling system with associated BMS controls. Please note that this arrangement is provided for information only. Consultants shall be responsible for the design of any installed cooling system and associated controls.

2.3 Food Storage

AC applications for refrigeration/cooling units associated with food storage will be accepted but will still require a formal application.

2.4 Process (associated with academic equipment)

A formal AC application is required for all cooling systems associated with academic process requirements. Generally there two types of process cooling. Direct water cooling (piped to academic equipment) and room air cooling for ambient room temperature control. All process applications are required to include all relevant manufacture's literature. The literature shall

clearly highlight the ambient temperature required for the academic equipment. If a temperature range is stipulated, the upper temperature limit shall be used for cooling plant capacity/sizing. This will minimise energy/carbon consumption. Without sufficient manufacturers supporting evidence all applications shall be rejected.

3.0 Application requirements

A formal AC application is required for both the new installation of air conditioning/comfort cooling equipment or replacement of any existing air condition/comfort cooling equipment. The application shall be submitted via the project team to the email address provided below and include the following information:

1. Completed comfort cooling/air conditioning application form (See appendix 1).
2. Provision of supporting information such as thermal modelling analysis, calculations, manufacturer's literature etc. No application shall be considered without the inclusion of adequate supporting information.
3. Provision of an annual carbon and energy impact as a result of the new newly installed comfort cooling/air conditioning equipment. The calculation shall provide a detailed estimation of the increase in energy/carbon that will be imposed on the University estate.

All applications shall be submitted to the following email address:

ac-applications@manchester.ac.uk

Appendix 1 Air conditioning/comfort cooling application form (one application per cooling system)

This document shall be submitted for each individual request for installation of any cooling system :

Date of Application	
Name of Applicant	
Organisation	
Building Name	
UoM Client Representative	
New Installation or replacement of existing	
University Project Number	
Brief Project Description	
Form of cooling provision (i.e. AHU coil, heat pump, VRF, air cooled chiller etc)	
Total Cooling Load of system	
No of indoor units	
Number of outdoor units	
Additional Information (if deemed necessary)	

This AC Application is for (mark with 'X' where appropriate) :

a. Thermal Comfort		c. Food Storage	
b. IT/communications room		d. Academic Process	
e. Other			

Provide a detailed HVAC description of the comfort cooling/air conditioning system that is being Submitted for approval:

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For thermal comfort applications provide a written summary as to how all other design methods for Limiting temperature have been considered (i.e. external solar shading, solar films, room layout changes, mechanical ventilation etc).

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Please confirm which of the below has been provided as part of the application (mark with 'X' as appropriate)

Overheating calculation analysis/report to BS 15251 (applicable for thermal comfort applications)	
Overheating calculation as per CIBSE guide A 2006 (applicable for thermal comfort applications)	
Manufacturers literature (applicable for process applications)	
Carbon and energy Impact calculations (for all applications)	

Recommendations

The Mechanical and Energy Team approves/rejects the application (mark with 'X' as appropriate).

Approved	
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Rejected	
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Name:	Date:
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Appendix 2 Example controls schematics for DX heat pump installation



