

Department of Facilities Management

1. PURPOSE

- 1.1. Memorial University is committed to promoting energy efficiency and conservation to benefit students, faculty, staff and the campus community. Conservation through careful energy and resource management helps to protect the environment, extend the life of our infrastructure and maintain a comfortable setting in which to work, teach and perform research.
- 1.2. Air-conditioned buildings use significantly more energy and resources than naturally ventilated ones. In addition, the initial cost of construction or retrofit can substantially impact on project budgets. The objective of the guideline is to ensure requests for air conditioning (cooling) are addressed in a consistent and sustainable manner.

2. SCOPE

- 2.1. This guideline shall apply to all new and existing buildings and facilities owned and/or operated by Memorial University of Newfoundland.

3. DEFINITIONS

- 3.1. Air Conditioning as discussed herein shall be limited to the requirement to provide mechanical cooling of the ambient air of a space.
- 3.2. Functional Air Conditioning shall be considered to be that which is required to facilitate the core requirements of the University in terms of maintaining a safe environment, facilitate teaching and/or research.
- 3.3. Comfort Air Conditioning shall be considered to be any application which is not functional and is generally meant to include locations and/or occasions when temperature control would be desirable by the occupants but not necessary to their duties or functions.
- 3.4. Mechanical Ventilation, as it relates to air conditioning, is considered to be the supply and discharge of unconditioned air from a space. This is generally at exterior temperatures and humidity.

4. GUIDELINE STATEMENT

- 4.1. The University will carefully consider heating, cooling and ventilation requirements during the design stage of all new buildings and major refurbishments and renovations.
- 4.2. Passive heat gain shall be addressed through the use of internal and external shading, coverings, window coatings or other sustainable methods defined as technology and practices change.
- 4.3. Active heat gain should be addressed, by the end users, by co-locating equipment or personnel to areas where cooling or ventilation systems are underutilized or schedules are complimentary. Use of timing systems, setbacks or turning off of

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unused electrical equipment (computers, processors, monitors) should be utilized to reduce heat loads, especially during the peak cooling season (July – August).

- 4.4. Mechanical ventilation will be considered where natural ventilation is found to be insufficient for oxygen replenishment, humidity control and air movement. Typical areas would include offices, classrooms, cleaning or preparation areas, storage or mechanical spaces or animal research areas. This determination shall be in accordance with the Occupation Health and Safety Regulation and industry standards including, but not limited to ASHRAE Standards.
- 4.5. Air conditioning will be considered for functional purposes where room processes require close temperature controls or mechanical ventilation has been found to be inadequate or less cost effective and all other means have been exhausted. Typical areas would include computer server rooms, process and/or instrumentation areas, and animal housing or research areas, and libraries.
- 4.6. Air conditioning will be considered for any space where the indoor air temperature exceeds 30°C for more than 15% of the normal working day in summer or where temperatures continuously exceed 30°C for more than 72 hours per year after all other methodologies have been exhausted.
- 4.7. Comfort air conditioning may also be deemed to be appropriate in large common meeting rooms, lecture theatres or certain office suites which may normally accommodate meetings with the public.
- 4.8. Air conditioning system (type) selection shall be at the discretion of the Department of Facilities Management and shall be in keeping the 5.0 Technical Requirements.
- 4.9. New water-cooled systems will only be considered for installation where all other options are not technically possible.
- 4.10. Where new open loop water cooled systems are installed, they shall be fitted with water volume measurement meters capable of reading water flow and/or consumption and relaying that information to the Department of Facilities Management, Energy Management System, via the existing DDC network. The cost for this equipment shall be carried by the funding department or unit.

5. TECHNICAL REQUIREMENTS

5.1. Window Air Conditioning Units

Window mounted units have traditionally been installed on an individual, adhoc manner without consideration of building aesthetics, maintenance or energy and water use efficiency. Their continued use has been deemed to be inconsistent with the Universities' long term objectives. As such, window mounted room air conditioners will no longer be considered a solution for room temperature control. It is intended to phase out all such units as they reach the end of their economic life cycle.

Where the continued requirement for supplemental air conditioning is justified, the space will be evaluated under the new guideline conditions and an appropriate system selected and installed. The cost of such new installations may be required to be borne by the requesting department.

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5.2. Water Cooled Systems (Free Standing)

Water Cooled (Open Loop) systems utilize high volumes of cool incoming municipal water to cool air over a heat transfer coil. Once the water passes the coil, it is discharged to the municipal drains (sewer) as waste water. This practice is now considered to be unsustainable, costly and unacceptable to the municipalities who are required to by law provide us with safe drinking water. The predominate reason for their use is low capital cost and ease of installation relative to competing systems.

5.3. Split Systems (DX and Chilled Water)

Split Systems utilize a refrigerant (DEX) or chilled water piped between an indoor air handling unit and a remote outdoor condensing unit. These units range in size and are an effective means of providing cooling to many area types. This system type requires the placement of a condenser unit on the exterior of the building. All future split systems will be installed in such a way that exterior condensers do not detract from the aesthetic appearance of buildings or grounds or interfere with grounds keeping and/or snow clearing. In general, this will require that condensing units be installed on roof tops that have been designed for or modified to accept the installation of mechanical systems.

5.4. Extension of Existing Central Plant Systems

Chilled water is mechanically cooled water which is distributed through pipes and used at the various locations to cool the air when required however the piping returns the water to the central plant for re-use. Chilled water is available in limited quantities throughout the campus, where small chillers exist however the expansion of this capacity is not anticipated to occur in the near term. The Department of Facilities Management has undertaken to develop a long term infrastructure plan for chilled water distribution throughout the St. John's Campus utilizing the Main Utilities Annex, which currently generates chilled water for the Health Sciences Center.

5.5. Short and Long Term Objectives

In the short term, all new requests for air conditioning will be addressed through the use of split systems with a strong preference to chilled water systems. The indoor portion of these chilled water systems can be connected to the large scale chilled water plants when they become available which will save cost and increase energy efficiency. Split systems have life spans of between 12 -15 years as the exterior condensers tend to degrade.

Additionally, DX Systems utilize potentially environmentally harmful controlled products as the refrigerants which are required to be inventoried and reported. Minimization of the use of these products is desirable

The long-term objectives of the University are to provide cooling systems to necessary areas throughout the campus via one or several centralized plant chilled water systems.



AIR CONDITIONING GUIDELINE

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6. PROCEDURES

- 6.1.** Requests for service or maintenance to existing air conditioning systems shall be made to the Department of Facilities Management in accordance with existing maintenance request processes.
- 6.2.** Requests for new air conditioning systems shall be made to the Department of Facilities Management in accordance with existing project request processes.
- 6.3.** Requests should include sufficient justification for the request as well as a description of measures which have already been implemented to reduce heat loads in the subject area.
- 6.4.** Facilities Management will review the existing heating/cooling systems and assess the requirements of the proposed space use to determine the optimal cooling solution.
- 6.5.** Should the installation of air conditioning be deemed warranted a system shall be selected and designed in accordance with the long term, sustainable objectives of the University.