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Spring 5-2017

230000 - General Mechanical Requirements

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Recommended Citation

Weatherbee, Stephanie L., "230000 - General Mechanical Requirements" (2017). *Division 23 – Heating, Ventilating and Air-Conditioning*. 1.

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SECTION 23 0000 – GENERAL MECHANICAL REQUIREMENTS

1.1 SUMMARY

- A. BUILDING SERVICES IDENTIFICATION LABELING – The University has adopted a comprehensive label identification for the distribution systems for all plumbing, fire protection, air, mechanical piping, electrical, fire alarm, controls, telecommunications, audio/visual, and security. The specific label colors, text, and directional flows for each component part are described in a single comprehensive table that is Chapter 5, Appendix A, Building Services Identification labeling. This labeling system must be part of any construction project, even those that are limited to a portion of a building or a single utility system.
- B. See Chapter 5, Division 01, Section 017700.1.1.B.1.i Closeout Procedures - Project Record Documents for equipment list requirements for all equipment provided in this section.
- C. The height of ceiling grids must be carefully coordinated with all MEP, FP, and Telecom systems in the plenum above the ceiling. Maintain a minimum clearance of 3” to allow UNH staff to move all tiles after the full installation is completed. Avoid obstructions with equipment and distribution piping so that tiles can be easily pushed up and slid sideways. All subcontractors working in the ceiling plenum must understand this requirement.

1.2 ENERGY EFFICIENCY

- A. Design firms shall provide the University with computer-generated energy models for the building using the appropriate modeling software to analyze various premium energy efficiency measures. Energy savings should drive the LEED process. Energy Modeling results shall meet or exceed the current NH Energy Code Requirements-<http://www.puc.nh.gov/EnergyCodes/energypg.htm>.
- B. Electric heat shall not be allowed for any space, unless approved in writing by the University.
- C. Air-conditioners, heat exchangers and other equipment with water-cooled once-through flow systems are not acceptable.
- D. Demand control ventilation utilizing carbon dioxide sensors shall be provided on all air handling systems serving auditoriums, lecture halls, and large classrooms to provide proper outside air ventilation and indoor air quality with maximum energy efficiency.
- E. Variable frequency drives shall be used on all fan and pump motors (both constant volume and variable volume applications).
- F. Energy recovery shall be used on all air handling systems. Air-to-air energy wheels that recover both sensible and latent heat are preferred.



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- G. In all areas that utilize air conditioning and have operable windows, window switches should be used that shut down air conditioning/ventilation equipment and put heating equipment into the unoccupied mode(e.g., fan coils, fin tube radiation, VAV boxes, Valance units) when the window is opened. Reference section 250000 1.9.I.
- H. Energy efficient equipment as determined by the latest edition of the following industry standards shall be used (most stringent requirements shall apply):
 - 1. ASHRAE Standard 90.1
 - 2. International Energy Conservation Code (IECC), most current adopted by the State of New Hampshire: <http://www.puc.nh.gov/EnergyCodes/energypg.htm>.
- I. All motors shall be premium efficiency as determined by the latest edition of the following industry standards (most stringent requirements shall apply):
 - 1. ASHRAE Standard 90.1
 - 2. International Energy Conservation Code (IECC) most current adopted by the State of New Hampshire: <http://www.puc.nh.gov/EnergyCodes/energypg.htm>.
- J. Space temperature settings will follow UNH Heating and Cooling Guidelines (Reference Section 250000 1.1.C.7.D)

1.3 REFRIGERANTS

- A. All University departments purchasing and/or installing refrigeration and/or air-conditioning units shall notify Facility Operations and Maintenance of said purchase so that equipment records and inventory can be kept current and shall submit all specification sheets, maintenance manuals and any other pertinent data pertaining to said equipment.
- B. The purchase or installation of refrigeration and/or air-conditioning systems utilizing chlorofluorocarbons (CFCs) is not acceptable. LEED EA Prerequisite 3 Refrigeration Management requires zero use of CFC-based refrigerant in new base building HVAC systems. When reusing existing base building HVAC equipment, a comprehensive CFC phase-out conversion must be provided.
- C. All new refrigeration/air-conditioning equipment shall utilize refrigerants that do not contain HCFCs or CFCs. LEED EA Credit 4 Enhanced Refrigerant Management requires that refrigerants used minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming AND do not install fire suppression systems that contain ozone-depleting substances (CFCs, HCFCs or Halons). In order to minimize the number of refrigerants in inventory, the following refrigerant types shall be used unless approved in writing by the University:
 - 1. R134a – Medium temperature applications. Packaged refrigeration and air conditioning equipment.
 - 2. R404a – Medium and low temperature applications. Reach-in and walk-in coolers and freezers, environmental rooms.



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3. R407c – Medium and low temperature applications. Air conditioning equipment.

- D. All contractors installing, servicing or repairing heating, air-conditioning and/or refrigeration equipment must certify to the University owner that their company and service/installation personnel are in compliance with all requirements of Section 608 of the Clean Air Act of 1990, and any and all subsequent amendments.
- E. All obsolete HVAC & refrigeration equipment shall be removed and discarded properly, not abandoned in place. Evacuation reports shall be submitted to the University Project Manager to document the reclamation of all refrigerants.
- F. The University, specifically Facility Operations and Maintenance, reserves the option of recovering refrigerants from all equipment being removed by outside contractors due to replacements, repairs and/or renovations.

1.4 GENERAL GUIDELINES

- A. Submetering is required for local/remote monitoring of large energy consuming equipment, and areas in residence halls and dining halls that will be separately billed by UNH Energy and Utilities.
 - 1. Sub metering is required for local monitoring of large energy consuming equipment (e.g. chiller plants), make-up water supply to cooling towers or when energy costs need to be calculated and allocated to different department sharing the same building.
 - 2. Metering and sub metering plans shall be submitted for review and approval with Design Development Documents.
- B. In addition to performance characteristics, specific product manufacturers listed in the standards are designed to control the University's maintenance and operations costs by minimizing spare parts stocks and personnel training requirements.
- C. All Serviceable equipment (smoke dampers, fire dampers, control dampers, acutators, duct smokes, fans, valves, coils terminal units, pumps, filters, isolation valves, clean-outs, junctions, etc.) installed behind an inaccessible finished surface shall require the installation of suitable access doors or reasonable size to accommodate inspection, maintenance and repair. Access doors may not be blocked by conduit, ductwork or any other obstruction.
- D. All new equipment shall be cleaned and vacuumed prior to start up. All ductwork and piping shall come to the site capped. Ductwork and piping shall remain capped or sealed throughout construction.
- E. Final approval in writing is required from the University to the contractor prior to mechanical equipment starting up for temporary purposes.
- F. During air handler startup all supply and return registers and diffusers shall be protected with 1-inch minimum roll filter.



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- G. Equipment Identification: Proper tagging shall be included of all equipment and valves. Phenolic tags shall be installed in the field and attached to the ceiling grid identifying valves and equipment location above the ceilings. Valve charts are required for all installations including plumbing and HVAC systems installed.
- H. Pipe Identification: All pipes in mechanical rooms and above ceilings shall be identified with the applicable colors with appropriate self-sticking or strap-on identification and arrows indicating direction of flow.
 - 1. Color Identification system by piping system.
 - 2. Minimum letter sizes for pipe identification.
- I. Lined Ductwork is not permitted.
- J. At the time Design Development documents are delivered to UNH, the project architect and or mechanical and electrical engineers shall provide signed written certification that the design meets all requirements of the New Hampshire State Energy Code in accordance with the New Hampshire Stand Building Code. The University may require more stringent specific energy efficiency measure.
- K. The University requires that for new spaces created by portioning of existing rooms/buildings or by additions shall meet the following minimum standards:
 - 1. Ventilation – to provide a healthy working environment, all occupied spaces shall be ventilated to meet current ASHRAE, ICC, International Mechanical and Energy Codes in accordance with the most current New Hampshire Building Code standards as a minimum.

1.4 METERING

- A. Gas and water meters shall be provided with dry contact pulse outputs and a local register readout. Meters with pulsing units that generate a voltage impulse are not acceptable. Pulse rates shall be no faster than 1 pulse per second. The BAS contractor shall run a pair of wires from each gas or water meter pulser to a 8x8x4 non-metallic weatherproof junction box located on the building exterior wall next to the gas meter for University installation of a meter reading radio transmitter.
- B. Meters shall also have standard numerical register for local reading. Water meters shall read in gallons and gas meters shall read in cubic feet. The contractor providing the meter is responsible for factory startup and calibration of the meter and coordination to ensure that meter pulse output meets requirements of University radio meter reading system. Radio meter reading specifications shall be included in the plumbing and gas specifications as required.

END OF SECTION 23 0000