

MEDICAL CENTER SPECIAL REQUIREMENTS FOR DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

2007 Edition, Published April 2007

The Special Requirements indicated in this appendix shall be incorporated in all Design Documents for Medical Center Projects. These Special Requirements consist of exceptions, revisions or additions to the base Building Design Standards.

23 00 00. HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

23 00 03. GENERAL PROVISIONS

.4.1 Provide ceramic bearings on fans controlled by a VFD for protection against eddy current bearing failures. Bearing life per Anti-Friction Bearing Manufacturers Association rating procedures shall be 90 percent expectancy of reaching at least 150,000 hours under design conditions.

.4.3 OSUMC Facilities Operations shall be provided with the above mentioned report, with the following information:

.4.3.3 Dates of maintenance at start-up, periodic inspections and scope of maintenance services performed.

.6 Systems serving patient care areas and systems serving clinical buildings as a whole shall be designed with N+1 redundancy such that the areas and building can still fully function with the largest piece of equipment out of service.

.7 The use of duct liner is strictly prohibited.

23 00 07. TESTING

.1.1.3 Water Chiller and Boiler Check Out: Specify that a factory-trained serviceman employed by the manufacturer perform adjustments, start-up, tests, and provide syllabus-of-training plus instructions to designated University operating personnel. Training by the manufacturer shall be coordinated with the Medical Center Facilities Services.

.2 The balancing contractor shall be hired by the Associate.

23 05 05. HVAC SPECIALTIES

23 05 20. METERS, GAUGES AND THERMOMETERS

.1.8 Utility metering shall support connection to the OSUMC Building Automation Delta Controls front-end through a BACNet compliant system to monitor for the purpose of improving operational efficiency of the building systems.

.2.1 Gauges shall be installed with ball valve shut-off. Gauges should also be installed upstream and downstream of pressure reducing stations. Gauge range shall be applicable to the installation.

.3.1 Thermometer scale range should be applicable to the installation.

- .3.2 Required applications include hot water converters, domestic water heaters, water tempering stations, air handling unit heating coils, air handler cooling coils, pressure reducing stations, chiller and condenser water systems.

23 05 25. VALVES

- .9.1 Shut-off valves with ball drain valves shall be provided in branches and risers.
- .10 Valve tags shall be tagged with OSU Medical Center nomenclature as: service-building ID (2 letter designation)-floor-valve number. For example, a heating hot water supply valve on the 2nd floor of Rhodes would be tagged HWHS-RH-2-34.

23 07 00. HVAC INSULATION

23 07 16. EQUIPMENT INSULATION

- .3 Chilled water pumps should be insulated with removable, reusable blanket insulation

23 07 19. PIPING INSULATION:

- .2.9 Provide removable, reusable blanket insulation for applications needing routine maintenance, including but not limited to, steam pressure reducing stations, strainers, pumps, chillers, etc.

23 09 00. INSTRUMENTATION AND CONTROL FOR HVAC:

- .1 All newly constructed and remodeled buildings/projects are to be controlled using BACnet compliant Direct Digital Controls. All controls shall tie in to the existing Delta Controls building automation front end. See OSUMC design standard for Building Automation Systems (MC Revised Appendix A).

- .1.1a OSUMC will require one BACnet Broadcast Management Device for every floor of every building. The OSUMC network will be segmented so that each floor will be a separate subnet from all others.

23 09 05. HVAC BUILDING SYSTEMS CONTROL:

- .1 See OSUMC design standard for Building Automation Systems in Medical Center Special Requirements Appendix A.

23 20 00. HVAC PIPING AND PUMPS

23 20 03. PIPING

- .1.2 Valve tags shall be tagged with OSU Medical Center nomenclature as: service-building ID (2 letter designation)-floor-valve number. For example, a heating hot water supply valve on the 2nd floor of Rhodes would be tagged HWHS-RH-2-34.

- .1.3 Valve number directory shall be noted on the as-builts.

23 20 05. PIPING MATERIALS:

- .5.2 Grooved Piping Systems for chilled water shall be approved by OSUMC Facilities.

.6.1 Grooved Piping Systems for condenser water shall be approved by OSUMC Facilities.

.6.2 PVC piping shall not be used.

23 20 13. PUMPS:

.3 Steam powered condensate return systems shall be supplied with sight glass.

.3.2 Combination pump-trap assemblies shall be utilized on systems with modulating steam valves to prevent condensate backup.

23 30 00. HVAC AIR DISTRIBUTION

23 30 05. AIR HANDLING UNITS WITH AND WITHOUT COILS:

.2 MULTIPLE FAN UNITS: Multiple fan units shall be provided for patient care areas, including but not limited to patient room units, operating room units, radiology area units, emergency department units, procedural area units.

.5 INTERIOR SURFACES: All interior panels shall be solid metal covering insulation. No perforated panels are allowed.

.7.2 Wheels shall be of heavy gauge welded design.

.7.4 Air handling units serving patient care areas shall be on emergency power.

23 33 00. AIR DUCT ACCESSORIES

.1.1 INSTALLATION: Specify that, after dampers are installed, the contractor shall operate each damper through all positions during air handling unit operation to assure free damper operation under an OSUMC representative.

.1.2 All fire and smoke dampers shall be provided with access panels for routine inspection and maintenance.

.1.4 LABELING: All fire and smoke dampers shall be labeled in accordance with OSUMC requirements. Dampers shall be labeled with either FD for fire damper, SD for smoke damper or FSD for combination fire/smoke damper, building abbreviation, floor and number. For example, a smoke damper on the 5th floor of Rhodes Hall shall be labeled SD-RH-5-19. Any modifications, deletions or additions within existing buildings shall have the number coordination performed with OSUMC Operations. A color coded dot shall be placed on the ceiling tile grid at the location of the access panel for ease of maintenance.

.1.5 Provide means of notifying the building automation system when a smoke damper or fire smoke damper has closed.

.1.6 Smoke dampers shall be electrically operated.

23 34 00. HVAC FANS

.1 GENERAL REQUIREMENTS: Centrifugal fans are preferred for supply and return air requirements. Air handling units shall be designed as draw-through units. Tubular centrifugal, axial and propeller fans may not be used unless written authorization is obtained from OSUMC Facilities.

23 36 05. AIR TEMPERING SYSTEMS:

.1.1 Outside air shall be controlled via two separate dampers. – a two-position minimum outside air damper and a modulating economizer damper – on all systems.

.2.1 General: Equipment shall be of adequate size to handle air quantities and static pressure in accordance with the design plus 20%. Air handling units shall be sized for the full connected load with no diversity consideration. Air velocities in branch runs shall be kept low enough to maintain noise levels of NC 25 or less in the room.

.2.2.1.2 Provide ceramic bearings on fans controlled by a VFD. Bearing life per Anti-Friction Bearing Manufacturers Association rating procedures shall be 90 percent expectancy of reaching at least 150,000 hours under design conditions.

.2.8 Terminal Boxes: Terminal boxes shall be provided with fiber free liner with solid sheet metal interior. Terminal boxes shall be pressure independent with hot water reheat coils. Terminal boxes shall be located outside of patient rooms and other patient care procedural rooms for ease of maintenance and accessibility. Control boxes shall be installed where easily accessible. Terminal boxes shall be provided for each individual office, lab, exam room and patient care room unless approved otherwise by OSUMC Facilities Operations.

.2.8.1 Labeling: All terminal boxes shall be labeled in accordance with OSUMC requirements. Terminal boxes shall be labeled with TB, building abbreviation, floor and number. For example, a terminal box on the 5th floor of Rhodes Hall shall be labeled TB-RH-5-19. Any modifications, deletions or additions within existing buildings shall have the number coordination performed with OSUMC Operations. A color coded dot shall be placed on the ceiling tile grid at the location of the access panel for ease of maintenance.

.2.8.2 VAV applications: minimum settings shall be carefully chosen so as not to create excessive negative pressurization and therefore infiltration.

.2.8.3 Modification: When modifying systems within existing buildings, confirm design conditions with OSUMC Facilities.

23 40 00. HVAC AIR CLEANING DEVICES

.1 REQUIREMENT FOR FILTERS: All air supplied by a forced air type unit or system shall be filtered. Pre-filter and intermediate filter combinations shall be provided upstream from the coils. After-filters shall be on the discharge of the fan and downstream from all coils. Filter size shall be 24"x24" without approval from OSUMC Operations.

Pre- Filter % Efficiency	Intermediate- Filter % Efficiency	After- Filter % Efficiency
30	60	80-95
30	60	95-99
30	60	HEPA

- .5 AIR FILTRATION FOR HOSPITALS: Air filtration shall comply with the AIA Guidelines for Design and Construction of Health Care Facilities, latest edition, unless noted differently above.
- .8 ELECTRO-STATIC FILTERS shall be prohibited.
- .9 HEPA FILTERS:
 - .9.1 Shall be on air handling units serving operating rooms, all cancer patient rooms, all intensive care rooms.
 - .9.2 HEPA filter installations shall be tested and certified by a third party testing agent hired by the Associate. Testing for certification shall include a smoke test for leakage and particle count verification. Any deficiencies for certification shall be repaired/replaced by the installing contractor.

23 50 00. CENTRAL HEATING EQUIPMENT

23 57 00 HEAT EXCHANGERS

- .1 SYSTEM DESIGN:
 - .1.1 The building shall be supplied with a fully redundant heating system, including heat exchangers and pumps. Heat exchangers shall be designed to supply 180-200 degF heating hot water to the building.
 - .1.2 Heat exchangers shall be steam to hot water converters utilizing shell and tube configuration. The tubes shall be stainless steel.

23 60 00. CENTRAL COOLING EQUIPMENT

23 60 05. COILS AND PIPING SYSTEMS:

- .2 PIPING: Piping for hot and chilled water systems shall include isolation valves, drain valves, air vent facilities and pipe unions at each individual coil as well as its own isolation and balance valves. Air vents (automatic or manual as appropriate) with a line extended to an adjacent floor drain shall be specified for installation wherever air is likely to be trapped. A strainer with isolation valves on the suction side of a pump and a pressure relief valve are required on all systems. Back-flow preventers shall be provided to prevent contamination of potable water systems.

23 64 05. CHILLERS:

- .1 Refrigerants shall be coordinated with OSUMC Facilities.

23 65 00. COOLING TOWERS:

- .1.6 Provide sump heaters on all cooling towers.

23 80 10. LIQUID HEAT TRANSFER:

- 4 Consideration shall be given to provide 50% propylene glycol in all systems requiring freeze protection.

23 80 17. DESIGN AND INSTALLATION OF STEAM PRESSURE REDUCING STATIONS:

- .2 MAIN BUILDING STATIONS: Pressure reducing stations and desuperheaters shall be utilized to reduce the incoming campus steam from 200 psi/585 degF to 70psi/400 degF for utilization to produce heating hot water, domestic hot water, etc. Pressure reducing stations shall be located immediately adjacent to the exterior wall within the building walls, not in a vault.

23 84 00 HUMIDIFIERS:

- .1 USAGE: Humidification levels shall be maintained per the requirements of the AIA Guidelines for Design and Construction of Health Care Facilities, latest edition.
- .2 DESIGN: Humidifiers shall be direct steam injection. Humidifiers shall be accessible for routine maintenance.

END OF DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING (HVAC)