

15720 Air Handling Units

Part 1: General

- 1.01 The intent of these specifications is to provide air handlers, which will be maintainable and efficiently condition and supply air to the building.
- 1.02 Air handlers in buildings shall be located in one or more dedicated mechanical room spaces to efficiently serve the building spaces. Roof top units (RTU’s) are not acceptable.
- 1.03 Quantity and distribution of air handlers should be aligned with building function to minimize the operation of equipment during partial occupancy.
- 1.04 Space requirements for air handlers shall be based upon these specifications.

Part 2: Design Guidelines

- 2.01 Exterior Design Conditions:

	<u>Summer (DB/WB)</u>	<u>Winter (DB)</u>
Animal Facilities (100% OA)	99/78	10
Lab Facilities (100% OA)	96/77	10
Office / Classroom Facilities	92/76	16
- 2.02 Damper Types: Dampers shall be opposed blade.
- 2.03 Economizer and Minimum Ventilation Operation
 - a. All air handlers using return air will have an economizer sequence.
 - b. Economizer sequence shall operate by enthalpy based on adjustable set points, (not return and outside enthalpy comparison) taking into consideration an outside temperature operating range of 45 to 65 deg F.
 - c. The economizer sequence shall not lock out the cooling or heating valve sequence for the air handler.
 - d. The ASHRAE 62 minimum ventilation requirements should be met by a sequence of operations including direct measurement of the outside air volume or the mathematical differential of the direct measurement of the return and supply air volumes.
 - e. For office/classroom air handlers, during scheduled unoccupied times, all outside air intake dampers will be closed and building exhaust fans will be shut off.
- 2.04 Filter Section: Filter sections shall have access doors on both sides of the filter section. A magnahelic gauge shall be mounted on the outside of the cabinet with copper probes measuring the pressure drop across each filter section.
- 2.05 Filter Types: Pre-filters shall be 2” or 4” 30% Dust Spot Efficiency, 90% Arrestance (MERV 8). Final filters shall be the box type or the bag type. If the bag type filter is utilized, a rack system to support the bags must be provided. Exceptions for constant speed fans that keep the bags “expanded” may be considered. Final filters for office/classroom applications shall be 65% Dust Spot Efficiency, 95% Arrestance

- (MERV 11). Final filters for lab applications shall be 95% Dust Spot Efficiency, greater than 98% Arrestance (MERV 15).
- 2.06 Cabinet Construction: Double wall construction with a minimum of 18 gauge. A full access section shall be provided between the chilled water and preheat coils.
 - 2.07 Access Doors: Access doors shall be included between each air handler component. Access doors shall be double walled.
 - 2.08 Interior Lights: Built up or custom AHU's large enough for the interior to be accessed shall have marine-style fixtures equipped with compact fluorescents in each section. The lights will be switched from the exterior of the AHU. Switches shall contain indicator lights.
 - 2.09 Preheat Coils: Preheat coils may be steam or hot water, coil selection shall be discussed with NCSU Facilities before making a final decision. Steam preheat coils shall have integral face and bypass dampers, i.e. Wing coil. Steam condensate from the coil shall be removed by gravity and not lifted by steam pressure. Hot water preheat coils shall have circulating pumps to maintain water circulation through the coil.
 - 2.10 Coil Sections: Coil casings shall be stainless steel. Removable panels shall be located on both sides of the air handler unit.
 - 2.11 Drain Pans: Drain pans shall be stainless steel and shall extend the entire length of the coil section, and extend in the direction of airflow far enough to catch condensate at the maximum recommended coil air velocity. The drain pan for built up air handling units shall extend upstream of the coil a minimum of 6 inches to facilitate coil cleaning.
 - 2.12 Chilled water coils shall be selected on the basis of 44 ° F entering water temperature and 58 ° F leaving water temperature. Minimum tube velocity shall be 4 fps at full load condition. Select coils to maintain a 14 ° Δ T from 100% load down to 25 % part load.
 - 2.13 All coils shall be a minimum of six-row construction and a maximum of eight-row construction. Airflow and water flow shall be piped in a counterflow arrangement. All coils shall be constructed to facilitate cleaning. Access shall be provided on both sides of the coil.
 - 2.14 Chilled water coil control valves shall be 2 way, normally closed with pneumatic actuators. Provide variable flow loop for the building or process loop. All control valves and operators shall be selected for the full possible pump head on the loop. Control valves shall be in accordance with the HVAC controls design guideline.
 - 2.15 Chilled water flow control valves shall be pressure independent or autoflow flow control valves.
 - 2.16 All coils shall have non-ferrous headers and tubing.
 - 2.17 Clearances around the unit shall provide for full width coil removal. Indicate coil removal space on the enlarged mechanical room plans and sections.
 - 2.18 Variable frequency drives instead of vortex dampers shall be used for air flow volume control
 - 2.19 Reasonable air velocities shall be used to minimize the energy penalty to move air at heating and cooling coils and through the air handler. Heating coil face velocities shall be targeted at 550 FPM. Cooling coil face velocities shall be targeted at 450 FPM.
 - 2.20 The discharge duct from the air-handling unit fan shall be designed to minimize airflow system effects and resulting pressure loss.

- 2.21 Reasonable air velocities shall be used to minimize the energy penalty to move air within ducts connected to the air handler. The velocity in the return air, outside air, and discharge air ducts shall be held to a maximum of 1750 FPM, where possible.
- 2.22 Belt drives shall be equipped with cog type belts.
- 2.23 Motors shall conform to the NEMA premium motor specification. Refer to the design guidelines for motors in Section 15055.
- 2.24 Fiberglass materials shall not be exposed to the air stream.
- 2.25 Air handlers shall be set on minimum six (6) inch high concrete housekeeping pads.