

SECTION 17000

AUTOMATIC TEMPERATURE CONTROLS

PART 1 DESIGN DIRECTIVES

1.1 DESIGN CRITERIA

- A. Systems shall be Honeywell or Johnson only, with design and installation performed by factory employees or by sub-contractors working under the supervision of factory representatives. Bids from contractors purchasing equipment from wholesalers are not acceptable.
- B. All systems shall be Honeywell EBI or Johnson Metasys Extended Architecture. Connections to the main controllers shall be via an Ethernet system.
- C. Higher level controllers shall be powered through a minimum fifteen minute UPS. Consult with DC-FO&M during design to determine the controller level requiring UPS service.
- D. The consultant shall confer with DC-FO&M regarding the portions of the ATC system that will need to be on emergency power.
- E. Individual room controllers shall be DDC. The consultant shall confer with DC-FO&M to ascertain if the controllers are room sensors or limited range thermostats.
- F. The design intent of all ATC systems is to eliminate pneumatic systems. Electric actuators shall be used wherever possible. Where air compressors are required, the following shall be required:
 - 1. The air compressor shall serve only the ATC system.
 - 2. Shall be a duplex type.
 - 3. Shall be on emergency power.
 - 4. Shall have an adjustable low air pressure alarm.
 - 5. Tank size shall be calculated for 50% run time. Calculations shall be provided to the Commissioning Agent for system and installation verification.
- G. The consultant shall include in the design documents a point schedule.
 - 1. Point schedules shall include but not be limited to:
 - a. Air Handling Units:
 - 1.) Coil discharge air temperature(s).
 - 2.) AHU discharge air temperature.
 - 3.) Mixed air temperature.
 - 4.) Water temperature(s) supply & return.
 - 5.) Pressure differential across the filter bank(s).
 - 6.) Control valve(s) position.
 - b. All sump pumps, including elevator sump pumps.
 - c. Cooling coil condensate pumps.
 - d. Steam condensate pump sets.
 - e. Electronic fuel monitoring devices (serving buildings & emergency generators).
- H. The consultant shall include the sequence of operations in the specifications and not on the drawings.

- I. All new buildings and major building renovations having 1,000 points or more shall be equipped with a lap top computer and a dedicated, secure location within the building.
- J. Graphics shall be included for all projects.
 - 1. Devices shall have sufficient data to identify the area served, such as building, room name, room number, floor.
- K. Refer to DC Standards, 01000 General Requirements for requirements pertaining to VFD's and ATC panels.
- L. Air Handling Units:
 - 1. Each coil shall have an RTD temperature sensor located downstream of the coil in the approximate center. In larger air handlers where there are stacked coils, each coil shall have a sensor. The sensor shall report back to the front end and appear on the graphics.
- M. The consultant shall determine the number of electrical circuits required by the ATC contractor and provide the circuits to a termination box near the controller. The ATC contractor shall extend the power as required for the operation of the control system.
- N. Airflow monitors shall be specified and furnished in this section. The consultant shall confer with DC-FO&M to determine the appropriate flow measuring device and the accuracy required.
- O. The ATC system shall collect data for the following services at the rates indicated:

Service	Pulse unit
Condensate (steam)	Gallon
Chilled water	Ton hour
Electricity	Kilowatt hour
- P. All fume hoods equipped with air flow alarms shall signal to the Heating Plant via the DDC system.
- Q. Emergency generator dampers shall be normally open (spring return) and be on the emergency power system.
- R. All ATC wiring systems shall be in conduit in accordance with DC Standards 16110, RACEWAYS.

PART 2 PRODUCTS

2.1 GENERAL

- A. All devices shall be mercury free.

2.2 SENSORS

~~A.~~ Pump & fan status shall be determined by ~~differential pressure sensors, not solid core adjustable current switch sensors.~~ *Current switches shall have LED indicators. A single DP sensor, not two separate sensors, shall determine differential pressure. The ATC design shall include an appropriate delay when the sensed device is controlled by a variable frequency drive. Accuracy shall be $\pm 1\%$ over 100% of the range. Hysteresis shall be 5% of setpoint.*

1. ~~Mamac~~ *RE Technologies #CS1150A-LED*
2. ~~Ultralab~~

~~B.~~ *Pressure differential switches, acceptable manufacturers:*
1. ~~United Electric Controls Company~~

~~C.~~ Line length sensitive temperature sensors shall be RTD type, minimum 1,000 ohm.

~~D.~~ Hydronic temperature sensors shall be well type.

~~E.~~ Relative humidity sensors shall be accurate to $\pm 3\%$ over 100% of the range. Acceptable manufacturers:

1. Mamac
2. Vaisala

~~F.~~ Carbon monoxide sensors shall be accurate to $\pm 0.5\%$. Minimum life span is three years.

~~G.~~ Carbon dioxide sensors shall have recalibration intervals greater than every five years. Accuracy shall be ± 30 PPM.

2.3 SAFETIES

A. Non-averaging freeze stats shall be installed on all air-handling units after the heating coil. Where the heating coils have integral face & bypass dampers (Wing coils) the freeze stat shall be located after the cooling coil. One 25' long freeze stat shall be limited to 50 square feet of coil face area.

2.4 WIRING

A. *Minimum sensor size shall be 18 gage twisted wire.*

PART 3 EXECUTION

3.1 INSTALLATION

A. All wiring and enclosures shall comply with DC Standards 16010 BASIC ELECTRICAL REQUIREMENTS, 16110 RACEWAYS, 16135 CABINETS, BOXES, AND FITTINGS, and 16920 CLASS TWO WIRING.

B. Pneumatic tubing shall be in conduit with the last 6" exposed where the tubing connects to a moving device. A bushing must be installed at the end of the conduit to prevent chaffing.

C. The ATC contractor shall be responsible for the conduit run for the Ethernet connections from the ATC controller to the BDF.

3.2 COORDINATION

- A. If the project is to be commissioned, the contractor is required to work with the commissioning agent and related sub-contractors as required to fulfill the requirements of section 18000. The costs associated with this requirement shall be included in the contractor's base bid; hourly allowances are not acceptable.

END OF SECTION 17000