SECTION 15604

AUTOMATIC TEMPERATURE CONTROL (ELECTRIC)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install an Automatic Temperature Control (ATC) system of the type and function required on the Drawings and as herein specified.

B. Type of System: Electric.

C. Related Work Specified Elsewhere: "HVAC - General" is specified in this Division. "Cabinets and Enclosures" is specified in Section 16160.

D. Other Trades: The automatic temperature control trades shall coordinate and supervise other trades whose work affects the control systems.

E. Work Performed by Other Trades: The following incidental work shall be furnished by the designated trade under the supervision of the automatic temperature control (ATC) trade:

1. The heating/cooling trades shall:
   a. Install automatic valves and separable wells that are specified to be supplied as a portion of the control systems.
   b. Furnish and install all necessary: valved pressure taps, water, drain and overflow connections and piping.
2. The sheet metal trades shall:
   a. Furnish and install all automatic dampers.
   b. Provide necessary blank-off plates required to install dampers that are smaller than duct size.
   c. Assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper motors.
   d. Provide necessary sheet metal baffle plates to eliminate stratification and provide air volumes specified. Locate baffles by experimentation and affix and seal permanently in place only after stratification problem has been eliminated.
   e. Provide access doors or other approved means of access through ducts for service to control equipment.

1.2 QUALITY ASSURANCE

A. The system shall be installed, tested, and balanced by competent mechanics regularly employed by the temperature control manufacturer.

B. Acceptable Manufacturers:

1. Honeywell.
2. Johnson Service Co.
3. MCC Powers
4. Barber-Coleman

5. Robertshaw

1.3 JOB CONDITIONS

A. Scheduling of Work: Schedule all work so as not to delay the work of other trades.

1.4 SUBMITTALS TO THE ENGINEER

A. Shop drawings shall be submitted for approval as required by the General Conditions. Shop drawings shall consist of, but not be limited to, the following:
   1. Manufacturer's literature for all equipment including maintenance and operating instructions and parts lists.
   2. Description of operation for all systems.
   3. Electric wiring diagrams showing all wiring, and equipment including all inter-connections on a terminal to terminal basis. Refer to ladder wiring diagrams shown on the Drawings. Note any discrepancies due to actual system submitted.
   4. Panel layouts for all local and central panels.
   5. Valve and damper operator schedule showing size, configuration, capacity and location of all equipment.
   6. A detailed explanation of any control system that is different, or will function differently than that specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: The control system shall consist of all thermostats, temperature transmitters, controllers, automatic valves and dampers, damper operators, control panels, and other accessory equipment to fill the intent of the specification and provide for a complete and operable system. All 24 volt control wiring shall be provided by the automatic temperature control contractor as shown or required to provide a complete system. Refer to Drawings for electrical wiring and interlocks. All panels and devices shall meet the NEMA electrical classification of the space in which they are installed. See Drawing Sheet E-1 for NEMA schedule.

B. Electric Thermostats:
   1. Instruments shall be commercial style, metal cover, proportional or single acting as noted or required.
   2. Contacts shall be rated for motor horsepower as required.
   3. Covers shall have visible thermometer, set point adjustment knob except when concealed or removable key adjustment is noted.
   4. Remote bulb thermostats shall be used as noted and when thermostat cannot be located in controlled space due to space electrical rating or corrosion requirements. Provide guard for bulb sensor.
   5. Wet area thermostats shall be used where noted in Part 3 of this Section. Provide NEMA 4 enclosure with clear plastic cover to reveal set point. Sensing element externally mounted and tin plated. Snap switch sealed against

contamination. Insulated case with internal grounding screw, equal to Honeywell Tradeline Model T631F.

C. Dampers:
   1. All control dampers shall be furnished as part of Section 15862.
   2. All dampers shall be installed by sheet metal trades.

D. Damper Operators and Linkages:
   1. Damper operators shall be electric open-close or fully proportioning as indicated or required.
   2. Linkages shall be suitable to connect operator to damper leaves and transmit full torque of motor. All necessary hardware shall be included with the linkages.
   3. Damper motors shall be quiet in operation and shall have ample power to overcome friction of damper linkage and air pressure acting on louvers to position dampers accurately and smoothly. The damper operator mounting arrangement shall be outside the airstream wherever possible.
   4. The operators shall be capable of operating at varying rates of speed to correspond to the dictates of the controllers and variable load requirements. The operators shall be capable of operating in sequence when required by the sequence of the operation. The operators shall have external adjustable stops to limit the stroke in either direction. The operator linkage arrangement shall be such as to permit normally open or normally closed positions of the dampers as required.
   5. Electric Operators:
      a. On-off, reversing, or proportional as required.
      b. Spring return to closed or open position as required.
   6. Dampers associated with emergency generator cooling shall fail open on loss of electrical power.

E. Miscellaneous Devices:
   1. Provide all the necessary relays, positioners, clocks, transformers, etc. to make a complete and operable system.
   2. Locate these devices on local panel unless specified otherwise.

PART 3 - EXECUTION

3.1 DESCRIPTION OF OPERATION

A. See Drawings.

3.2 INSTALLATION

A. The automatic temperature control mechanics shall provide supervision and direction for all trades that are installing equipment supplied by the temperature control manufacturer.

B. All controllers, wiring, equipment, etc., shall be installed by mechanics regularly employed by the temperature control manufacturer.

C. Control wiring shall be neatly installed, parallel to building lines, and in locations not subject to damage.

3.3 COMPLETION

A. Upon completion of the project, the control system provider shall:
   1. Completely adjust, ready for use, all thermostats, controllers, valves, damper operators, relays, etc., provided under this Section.
   2. Furnish three (3) instruction manuals covering the function and operation of the control systems on the project for the use of the Owner's operating personnel. A representative of the ATC systems provider shall be available on site for 8 hours of start-up and shall conduct an operational test of the system in the presence and satisfaction of the Engineer's designated representative and the Owner's representative. During this 8-hour period, the technician shall instruct the Owner's Representatives in the proper use and routine maintenance of all ATC equipment.

3.4 OPERATOR TRAINING

A. Operator Training shall be performed by a duly authorized representative of the ATC system provider, who is fully trained in the installation, startup and operation of the equipment.
B. Provide combined training and operational assistance for plant operators in the proper operations of the ATC system equipment, and in the techniques, methods, schedules, etc. associated with maintenance.

3.5 IDENTIFICATION

A. Provide all control equipment, panels and manual controls with black lamacoid nameplates engraved with white letters indicating the function, tag number, service or apparatus being served.
B. Properly number all wires and terminals where applicable.

3.6 GUARANTEE

A. The control system designated on Drawings and plans and herein specified, shall be guaranteed to be free from original defects in both material and workmanship for a period of one (1) year of normal use and service, excepting damages from other causes. This guarantee shall become effective starting the date the Owner begins to receive beneficial use of the system.

END OF SECTION