

## **Part 1 General**

### **1.1 SUMMARY**

- .1 Section Includes:
  - .1 Methods and procedures for shop drawings submittals, preliminary and detailed review process including review meetings, for building Energy Monitoring and Control System (EMCS).
- .2 Related Sections:
  - .1 Section 25 05 01 - EMCS: General Requirements.
  - .2 Section 25 01 11 - EMCS: Start-up, Verification and Commissioning.

### **1.2 SUBMITTALS**

- .1 Make submittals in accordance with:
  - .1 Division 01 – General Requirements.
  - .2 Section 21 05 01 – Common Work Results for Mechanical.
  - .3 Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and start-up instructions for each type of product indicated.
  - .4 Each control device labelled with setting or adjustable range of control.
- .2 Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, and method of field assembly, components, and location and size of each field connection:
  - .1 Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
  - .2 Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
  - .3 Details of control panel faces, including controls, instruments, and labeling.
  - .4 Written description of sequence of operation.
  - .5 Schedule of dampers including size, leakage, and flow characteristics.
  - .6 Schedule of valves including close-off and flow characteristics.
  - .7 Trunk cable schematic showing programmable control unit locations and trunk data conductors.
  - .8 Listing of connected data points, including connected control unit and input device.
  - .9 System graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
  - .10 System configuration showing peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
- .3 Protocol Implementation Conformance/BACnet Interoperability Building Blocks  
Statements clarifying which BACnet objects and services are supported by each controller.

- .4 ANSI / ASHRAE™ Standard 135-R2008, BACnet PIC/BIBB Statement: Proof of Compliance Level 3 or higher is required to protect building owner by reducing future maintenance and expansion costs.
- .5 Samples: For each color required, of each type of thermostat cover.
- .6 Software and Firmware Operational Documentation: Include the following:
  - .1 Engineering, Installation, Operation and Maintenance manuals.
  - .2 Program Software Backup: On a magnetic media or compact disc, complete with data files.
  - .3 Device address list.
  - .4 Printout of software application and graphic screens.
  - .5 Licenses, guarantee, and warranty documents for all equipment and systems.
- .7 Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- .8 Schedules:
  - .1 Within two weeks of contract award, provide a schedule of the work indicating the following:
    - .1 Intended sequence of work items.
    - .2 Start dates of individual work items.
    - .3 Duration of individual work items.
    - .4 Planned delivery dates for major material and equipment, and expected lead times.
    - .5 Milestones indicating possible restraints on work by other trades or situations.
  - .2 Provide monthly written status reports indicating work completed, revisions to expected deliver dates, etc. an updated project schedule shall be included.
- .9 Qualification Data: For firms and persons specified in “Quality Assurance” Article.
- .10 Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors. Revise Shop Drawings to reflect actual installation and operating sequences.

### **1.3 QUALITY ASSURANCE**

- .1 Bids by wholesalers, distributors, mechanical contractors and non-franchised contractors shall not be acceptable.
- .2 The contractor shall have an established working relationship with the control system manufacturer, and be an authorized representative of the manufacturer at bid time.
- .3 The contractor shall have successfully completed control system manufacturers classes on the control system. Departmental Representative reserves the right to request proof of training.

- .4 The system manufacturer shall, as a minimum, manufacture and supply the Variable Air Volume Direct Digital Controller, Unitary Equipment Controller, Advanced Application Controller and Graphical User Interface.
- .5 All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this.
- .6 The EMCS contractor shall have a full service facility within 200 km of the project that is staffed with engineers trained in Integrating Interoperable Systems and technicians fully capable of providing routine emergency maintenance service on all system components.
- .7 Mechanical equipment manufacturers that are listed as approved to provide DDC type controls may submit a bid with factory mounted controls, and shall also provide a separate bid for their products less all controls, actuators, valve assemblies and sensors, which are specified to be provided by the EMCS contractor.
- .8 Electrical Components, Devices, and Accessories: Listed and labelled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- .9 Comply with NFPA 90A, "Installation of Air Conditioning and Ventilation Systems."
- .10 Comply with Canadian Electric Code, UL-916 Energy Management Systems, ULC, FCC Part 15, subpart J, Class B Computing Devices.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to unit manufacturer.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.
- .7 Label location of salvaged material's storage areas and provide barriers and security devices.
- .8 Ensure emptied containers are sealed and stored safely.

- .9 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Site Representative.
- .10 Fold up metal and plastic banding, flatten and place in designated area for recycling.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

END OF SECTION