

**PIKES PEAK PARKING RESTORATION**

**TABLE OF CONTENTS**

**DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING**

230400 - Basic HVAC Requirements  
238239.19 - Wall and Ceiling Unit Heaters

## **SECTION 230400 - BASIC HVAC REQUIREMENTS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Basic requirements common to the work in general of Division 23 and other Divisions and Sections of the Specification where referenced.
- B. Provide, unless specified otherwise, all labor, materials, and equipment necessary for completely finished and operational HVAC systems described and specified under other Sections of this Division 23.
- C. Provide all minor incidental items such as offsets, fittings, and accessories required as part of the work even though not specified or indicated.
- D. Inspection: Inspect work preceding or interfacing with work of Division 23 and report any known or observed defects that affect the Work to the General Contractor. Do not proceed with the work until defects are corrected.

#### 1.3 REFERENCES

- A. General:
  - 1. For products or workmanship specified by association, trade, or Federal Standards comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable Codes.
  - 2. The date of the standard is that in effect as the date of the Contract Documents, except when a specific date is specified.
  - 3. When required by individual Specifications Section by means of reference for cleaning or installation requirements, etc., obtain a copy of the standard. Maintain the copy at job site during work until substantial completion. Copy may be in electronic format.
  - 4. Schedule of Referenced Organizations: Reference Section 014200 "References" for a list of the acronyms of organizations referenced in these Specifications.

#### 1.4 DEFINITIONS

- A. Conform to Division 01: These Specifications are of abbreviated, simplified, or

streamlined type and include incomplete sentences. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the Contract Documents so indicates.

B. The following words are re-defined and/or elaborated on for the context of Division 23 work:

1. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
2. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
3. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
4. General Contractor: The term "General Contractor" used in Division 23 and elsewhere in the Contract Documents means the party with whom the Owner has executed the Owner-Contractor Agreement.

## 1.5 QUALITY CONTROL

- A. Conform to Division 01. Materials and apparatus required for the work to be new and of first-class quality; to be furnished, delivered, erected, connected and finished in every detail; and to be so selected and arranged so as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article shall be furnished.
- B. Unless otherwise specifically indicated, equipment and materials to be installed in accordance with the recommendations of the Manufacturer. This includes the performance of tests as recommended by the Manufacturer.

## 1.6 REGULATORY REQUIREMENTS

- A. Comply with latest editions of all applicable Codes, Standards, Ordinances and Regulations in effect as of the date of the Contract Documents adopted by CCD, BD, and FD, including but not necessarily limited to the following:
1. National Electrical Code NFPA-70.
  2. NFPA.
  3. ASHRAE.
  4. SMACNA.
  5. Underwriters Laboratories.
- B. If discrepancies occur between the Contract Documents and any applicable Codes, Guidelines, Ordinances, Acts, or Standards, the most stringent requirements shall apply.

- C. Where hourly fire ratings are indicated or required, provide components and assemblies meeting requirements of the American Insurance Association, Factory Mutual Insurance Association and listed by Underwriters Laboratories, Inc.

#### 1.7 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Substitutions: Refer to Division 01, General Requirements.
- B. Some materials and equipment are specified by Manufacturer and catalog numbers. The Manufacturer and catalog numbers are used to establish a degree of quality and style for such equipment and material.
- C. When alternate or substitute materials and equipment are used, Contractor shall be responsible for space requirements, configurations, performance, changes in bases, supports, structural members and openings in structure, electrical changes and other apparatus and trades that may be affected by their use.
- D. When providing a product and/or service under the qualification of "acceptable equal," Contractor shall be entirely responsible for additional costs incurred due to modifications to the civil, architectural, structural, mechanical, and electrical design that may be required to accommodate the "acceptable equal."
- E. Substitute materials and equipment are only allowed to be provided from the Manufacturers listed as approved.

#### 1.8 SHOP DRAWINGS, PRODUCT DATA, AND AS-BUILT DRAWINGS

- A. General: Comply with the General Conditions of the Contract and with Division 01 - General Requirements.
  - 1. All documents shall be submitted in electronic format.
  - 2. All submittals to be provided in accordance with requirements as specified in Section 013300 "Submittal Procedures".

#### 1.9 CONTRACT RECORD DOCUMENTS

- A. General: Comply with the General Conditions of the Contract and with Division 01 - General Requirements,

#### 1.10 OPERATING AND MAINTENANCE DATA

- A. HVAC Contractor shall submit electronic copy containing a single PDF file of the entire maintenance manual to the DEN Project Manager, General Contractor for their approval.
- B. All submittals to be provided in accordance with requirements as specified in Section 013300 "Submittal Procedures".

C. The manual shall have:

1. Alphabetical list of all system components including the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year's operation.
2. Operating instructions for complete system, including emergency procedures for fire or failure of major equipment and procedures for normal starting/operating/shutdown and long-term shutdown.
3. Maintenance instructions, including valves, valve tag and other identified equipment lists, proper lubricants and lubricating instructions for each piece of equipment and necessary cleaning/replacing/adjusting schedules.
4. Manufacturer's data on each piece of equipment, including:
  - a. Installation instructions.
  - b. Drawings and specifications (approved shop drawings).
  - c. Parts lists.
  - d. Complete wiring and temperature control diagrams (approved shop drawings).

1.11 FINAL OBSERVATION

A. Comply with the requirements of Division 01 and the following:

1. Prior to the request for final observation, all Work under the contract shall be completed; all systems shall be in proper working order and placed in operation (System Startup of 48 hours).
2. All equipment shall be cleaned, including but not limited to, plumbing fixtures. All debris and construction materials shall be removed from the DEN property to a DEN approved landfill off-airport.
3. The temperature control system shall be complete and in proper working order. All instruments shall be properly and accurately field calibrated.
4. At the request of the DEN Project Manager, a representative of the Contractor who is thoroughly familiar with the Project and operation of the various systems shall be present during the final observation to demonstrate proper operation of the equipment and controls. If requested by the DEN Project Manager, the Contractor shall have representatives from his subcontractors present to assist during final observation.

1.12 PROJECT CONDITIONS

A. Accessibility.

1. Provide carpentry, masonry, concrete and metal work required for work of this Division where not specifically called for under other Sections.

B. Freeze Protection.

1. Do not run lines in outside walls, or locations where freezing may occur. Piping next to outside walls shall be in furred spaces with insulation between the piping

and the outside wall. Insulation of piping shall not be considered freeze protection.

#### 1.13 COORDINATION

- A. General: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.
- B. Drawings and Specifications: The Mechanical Drawings indicate the general design and arrangement of lines, equipment, systems, etc. Information shown is diagrammatic in character and does not necessarily indicate every required offset, fitting, etc. Do not scale the Drawings for dimensions. Take dimensions, measurements, locations, levels, etc., from the Architectural and Engineering Drawings and equipment to be furnished.
- C. Discrepancies: Examine Drawings and Specifications for other parts of the work, and if any discrepancies occur between the plans for the work of this Division and the plans for the work of others, report such discrepancies to the DEN Project Manager and obtain written instructions for any changes necessary.
- D. Order of Precedence: The precedence of construction documents are as Specified in the General Conditions.

#### 1.14 START-UP PROCEDURES

- A. Ensure that all control systems are fully operational in automatic mode.
- B. Notify the DEN Project Manager in writing a minimum of 48 hours prior to start-up of all major mechanical equipment and systems.

#### 1.15 SCHEDULE OF TESTING

- A. Provide testing in accordance with the General Conditions of the Contract.
- B. Notify the DEN Project Manager, DEN Mechanical Inspector, and DEN Mechanical Engineer in writing a minimum of 72 hours prior to testing of any mechanical equipment and systems.
- C. All testing must be performed in the presence DEN Project Manager and or his designated representative; his signature for verification of the test must appear on the schedule.

#### 1.16 CLEANING AND FINISHING

- A. Provide cleaning in accordance with the General Requirements of the Contract.
- B. Cleaning shall include but not be limited to removing grease, dirt, dust, stains, labels,

fingerprints, and other foreign materials from sight-exposed piping, ductwork, equipment, fixtures and other such items installed under Division 23 of the work. If finishes have been damaged, refinish to original condition and leave everything in proper working order and of intended appearance.

- C. Clean HVAC Systems in accordance with applicable Division 23 Sections.

#### 1.17 WARRANTIES

- A. Conform to Division 1: Provide a written warranty covering the entire mechanical work to be free from defective materials, equipment, and workmanship for a period of two (2) years after date of acceptance. During this period, provide labor and materials as required to repair or provide labor and materials required to repair or replace defects.
- B. Provide special warranties for such items of equipment that have been or are specified to have warranties in excess of two (2) years.

#### **PART 2 - PRODUCTS (Not Applicable)**

#### **PART 3 - EXECUTION (Not Applicable)**

#### **PART 4 - MEASUREMENT**

##### 4.1 METHOD OF MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

#### **PART 5 - PAYMENT**

##### 5.1 METHOD OF PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Unit Item Contract price.

END OF SECTION 230400

## **SECTION 238239.19 - WALL AND CEILING UNIT HEATERS**

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes wall and ceiling heaters with propeller fans and electric-resistance heating coils.
- B. Alternates: Refer to Division 01 Section 012300 "Alternates" for description of Work in this Section affected by Alternates.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
  - 2. Include data substantiating that materials comply with requirements.
- B. LEED Submittals:
  - 1. Product Data for Prerequisite IEQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."
- C. Shop Drawings:
  - 1. Include plans, elevations, sections, and details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances.
  - 3. Include details of anchorages and attachments to structure.
  - 4. Wiring Diagrams: Power, signal, and control wiring.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wall and ceiling unit heaters to include in emergency, operation, and maintenance manuals.



## 1.5 QUALITY ASSURANCE

- A. Comply with NFPA 70. Listed and labeled by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of condensing units that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: Minimum 2 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Radiated noise shall not exceed:
  - 1. NC 35 – In Office.
  - 2. NC 40 – Terminal/Concourse.
  - 3. NC 45 – Maintenance Facilities.

### 2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Berko; Marley Engineered Products.
  - 2. Chromalox, Inc.
  - 3. Indeeco.
  - 4. Markel Products Company; TPI Corporation.
  - 5. Marley Engineered Products.
  - 6. Ouellet Canada Inc.
  - 7. QMark; Marley Engineered Products.
  - 8. Trane Inc.
  - 9. or approved equal.

### 2.3 DESCRIPTION

- A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.4 CABINET

- A. Front Panel: Stamped-steel louver, with removable panels fastened with tamperproof fasteners.
- B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by DEN Project Manager.
- C. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

## 2.5 COIL

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection.

## 2.6 FAN AND MOTOR

- A. Fan: Aluminum propeller directly connected to motor.

## 2.7 CONTROLS

- A. Controls: Unit-mounted thermostat. See Plans for location.
- B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

## **PART 3 - EXECUTION**

### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install wall and ceiling unit heaters to comply with NFPA 90A.
- C. Install wall and ceiling unit heaters level and plumb.
- D. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage to other materials.
- E. Protection: Provide finished cabinet units with protective covers during balance of construction.

- F. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.
- G. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- H. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- I. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

#### **PART 4 - MEASUREMENT**

##### 4.1 METHOD OF MEASUREMENT

- A. No separate measurement shall be made for work under this Section.

#### **PART 5 - PAYMENT**

##### 5.1 METHOD OF PAYMENT

- A. No separate payment will be made for work under this Section. The cost of the work described in this Section shall be included in the Unit Item Contract price.

END OF SECTION 238239.19