

***Sample Specification for ABSOLUTAIRE, INC. E-Series Product Line***

**SECTION 15622**

Revision 04/01/09a

**DIRECT GAS-FIRED AIR TURNOVER SPACE HEATING SYSTEM**

**PART 1: GENERAL**

**1.1 Section includes:**

- A. Direct gas-fired air turnover space heaters**
- B. Controls**
- C. Equipment schedule**

**1.2 Related Sections**

- A. Section 01655: Starting up mechanical systems**
- B. Section 15070: Pipe and fittings**
- C. Section 15100: Valves**
- D. Section 15120: Piping specialties**
- E. Section 15400: Plumbing systems**
- F. Section 15990: Testing, adjusting and balancing**
- G. Section 16050: Basic electrical materials and methods**

**1.3 References**

- A. American National Standards Institute (ANSI): Establishes requirements to certify direct gas-fired heating & ventilating equipment.**
- B. ETL Testing Laboratories: Independent testing facility certifies conformance to applicable ANSI standards.**
- C. American Conference of Governmental Hygienists: Establishes air quality standards.**
- D. Environmental Protection Agency (EPA): Enforces air quality standards.**
- E. Occupational Safety and Health Administration (OSHA): Enforces air quality standards and safety in the work place.**
- F. National Electric Code (NEC): Establishes electrical standards.**
- G. Underwriters Laboratory (UL): Independent testing facility certifies code conformance.**

**H. National Fire Protection Agency (NFPA): Establishes fire prevention standards.**

**I. Factory Mutual Insurance (FM): Certifies gas manifold compliance to owner's insurance carrier.**

**Industrial risk Insurance (IRI): Certifies gas manifold compliance to owner's insurance carrier.**

#### **1.4 Quality Assurance**

**Manufacturer shall:**

**A. Provide direct gas-fired air turnover space heater built in conformance to NFPA-54 and/or ANSI Z-83.18-2008b standards, and shall be ETL, UL, AGA and/or CGA listed.**

**B. Provide direct gas-fired heating equipment that does not exceed contaminant threshold limits for a safe environment, as established by the American Conference of Governmental Hygienists.**

**C. Furnish proof, satisfactory to the owner or his representative, of having manufactured space heating systems for a minimum of five years.**

**D. Make its facility available to owner or his representative for quality control audit without prior notification.**

#### **1.5 Submittals**

**A. Manufacturer shall submit product data, including dimensions, duct & service connections, accessories, controls with schematics and sequence of operation, electrical nameplate data, wiring diagrams, fan curves, burner and filter data.**

**B. Manufacturer shall furnish rigging, assembly, and installation instructions.**

**C. Manufacturer shall furnish Operation and Maintenance Manuals, including descriptive literature, operation instructions, maintenance and repair data, and parts listings.**

#### **2.1 Acceptable Manufacturers**

**AbsolutAire, Inc. (Kalamazoo, MI) Phone: 800-804-4000 Fax: 269-382-5291**

## 2.2 Direct Gas-Fired Air Turnover Space Heaters

Manufacturer shall:

- A. Provide an indoor upright direct gas-fired air turnover space heater.
- B. Provide self-contained, packaged heater(s) which shall include; casing; direct fired burner; axial propeller fan(s); motor(s), mixing chamber; CO<sub>2</sub> monitoring, and automatic controls for space temperature. Unit shall have a single point xxx/xx/xx electrical connection and one gas inlet. A non-fused {fused} disconnect will be factory provided & wired.
- C. Provide a casing of 20 gauge aluminized steel attached to extruded aluminum-tube framework, with a minimum design of 1-1/2 x 1-1/2 square and 3/16" wall thickness. All interior and exterior surfaces will be cleaned of all oil and grease. {Painted exterior will consist of a high-quality prime coat and a finish coat of machinery enamel with rust inhibitors. Color chosen by owner.} {All interior surfaces will be lined with 1-inch, 1-1/2 pound density, and coated fiberglass insulation. The insulation shall comply with UL standard 181 for erosion and NFPA 90A for fire resistance. Exposed edges will be coated to eliminate erosion. Insulation will be held in place with adhesive and pins}. {All interior surfaces will be lined with 20 gauge aluminized steel and sandwich 2-inch, 3 pound density, fiberglass insulation. The insulation shall comply with NFPA 90A for fire resistivity. Insulation will be held in place with adhesive}. Hinged access to the fan and burner will be provided {with an access door interlock switch to turn off power when the door is in the open position}.
- D. Provide a direct fired gas nozzle-mix line burner specifically designed to burn natural or propane gas below the maximum non-contaminating levels required by OSHA and the American Conference of Governmental Industrial Hygienists. Burner shall have non-clogging, stainless steel baffles attached to a non-corrosive aluminum cast gas supply section with no moving parts. The burner shall be designed for 100% thermal efficiency for the life of the equipment. Burner combustion blower shall provide airflow at the volume and static pressure to maintain proper burner firing rates as required to comply with ANSI Z83.18b-2003 while in operation. A burner gas pressure gauge will be provided to measure burner pressure. A combustion air pressure gauge will be provided to ensure proper burner pressure. Both gauges are intended to help verify nameplate settings.
- F. Provide outdoor air across the burner. The burner velocity shall be constant at all times throughout the operation of the heater. No air from

the indoor space shall be allowed to recirculate across the burner at any time. A high air flow switch and low air flow switch will be provided to ensure proper airflow is maintained to the burner.

- G. Provide an axial blade propeller fan(s) which shall be built-in, direct-drive with a variable frequency direct-drive motor for required air capacity. {Fan and motor shall be internally isolated from the unit framework with (rubber-in-shear) (spring type) vibration isolators}. The supply fan will include guarding at both the inlet and discharge of the fan so that personnel or items cannot enter the fan area without guard removal. The supply fan motor shall be {ODP} {TEFC} {EPACT} {Premium Efficiency}, with a minimum efficiency of \_\_\_\_\_% with a safety factor of 1.15. The motor shall be suitable for continuous service at 120 degrees F. ambient, and wired for the selected voltage, nominal 900 {1200} rpm and standard NEMA frame. Unit discharge velocity shall not exceed 1,200 FPM. Blower, motor and drive shall be factory-tested to provide the specified air delivery (per ANSI standards) at the design static pressure. Fan and motor shall be supported from reinforced structural steel framework. {Motor bearings shall have extended lube lines, which shall terminate at the heater exterior wall so that all lubrication can be performed without shutting down the system}. Sound power shall not exceed 75 dba at distance of 10 feet from the unit discharge opening at full airflow.**
- E. Filtered Room-Air Intake Plenum. Manufacturer shall provide a {2,3,4} sided intake air plenum designed for room air intake as detailed on the plans. The room air intake plenum shall be manufactured with galvanized or aluminized steel and shall include filtration of all indoor return air through 1" cleanable aluminum filters {polyester replacement media with integral wire frames} {Type 1 25-30% average efficiency pleated paper throw-away filters, in accordance with ASHRAE 52 Test Standard. UL Class 2}. {Manufacturer shall provide a clogged filter warning (light/alarm/magnehelic)}. The average face velocity of the filters shall not exceed 500 FPM. Fan inlet and discharge screens shall be provided as standard. The floor of the intake plenum shall be 16 gauge aluminized steel, designed to support service personnel.**
- H. Discharge Plenum. Manufacturer shall provide a {2,3,4} sided discharge head with adjustable horizontal air deflection blades for air supply distribution in a {180 degree} {270 degree} {360 degree} configuration, as detailed on the plans. The discharge head shall be constructed of aluminized or galvanized steel. The housing and blades are unpainted {painted – color owner selected}.**

## 2.2.1 Provide the Following Control System

*(Choose “A” Analog - or “B” DDC):*

### **A. ANALOG CONTROLS**

#### 1. The Control Panel

The ventilated main control panel shall be similar to NEMA 1 and contain all standard electrical components, including variable frequency drive, non-fused disconnect switch, CO2 monitor; airflow switch, high temperature limit switch, ignition and flame detection module, fusing, 120-volt and 24-volt transformers, control circuit fuse(s), a full number- coded terminal strip, all per current NEMA wiring standards. A “smart stat” temperature control located {on the heater exterior} {in the space} shall provide indication of the following:

- a. Power on
- b. Call for fan
- c. Call for heat
- d. Burner lockout alarm
- e. Dirty filter alarm (optional)
- f. Space temperature set point
- g. Current space temperature

The heater control panel shall have a burner flame supervision module to lock out the gas flow from the main gas valve in a burner lockout or other adverse condition. The complete control and safety system as well as the burner and gas manifold shall be factory tested. {The control enclosure shall be lighted with a minimum 25 watt incandescent light bulb, able to operate with the main disconnect switch in the off or on position}.

The following items will also be included (choose by deletion):

- a. Programmable 7-day time clock with a minimum of four (4) programmable on/off schedules per day, with a battery back-up.
- b. Burner alarm horn with silence switch,

### **B. DIRECT DIGITAL CONTROLS (DDC)**

The DDC Control System will be a factory installed and tested open protocol JeneSys® type consisting of system compatible control boards, sensors and program logic necessary to provide the features described as follows.

2. I/O Modules: Each I/O module shall have an LED status indication and be individually replaceable.
3. External Control Interface: Via an Ethernet connection, the equipment can be monitored or controlled.

4. Information and Control Functions: Individual unit controllers shall be capable of communicating information to and receiving control instructions from an on-site remote device or internet connection. The following control functions and instructions shall be available:
  - a. Space Temperature set point for occupied and unoccupied periods
  - b. Occupied and unoccupied scheduling with unlimited “on” periods per week per H&V unit.
  - c. Humidity control enable/disable, status, and set point (optional)
  - d. Discharge air temperature, current and history (optional)
  - e. Space temperature set point, current and history
  - f. Actual space temperature, current and history
  - g. Error reporting display and log capability of last 500 alarms, including date and time of each occurrence:
    - 1) Set point out of range
    - 2) High temperature limit shut down
    - 3) I/O module failure
    - 4) Fan motor fault
    - 5) Low gas pressure switch failure (optional)
    - 6) High gas pressure switch failure (optional)
    - 7) Low airflow switch
    - 8) High airflow switch
    - 9) Clogged filter alarm (optional)
    - 10) Loss of power
  - h. Personnel-Machine Interface: When the unit controller(s) are connected with a Cat 5e or better communication cable per the manufacturer’s instructions to a Windows® based computer (or computers using a network router), the following visual display and control features are available using a Java® enabled web browser:
    - 1) Fan Status
    - 2) Burner Status
    - 3) Occupied/Unoccupied Status
    - 4) Space Temperature set point and status
    - 5) Filter status, clear/clogged (optional)
    - 6) Time and Date
    - 7) Gas and electric usage (status and logged last 3 months)
    - 8) Fan run time (cumulative)
    - 9) Number of fan starts
    - 10) Optional customer designated points
    - 11) Selection of unlimited operating periods per week
    - 12) Flame relay reset (if applicable)

The DDC controls shall be housed in the main NEMA 1 control enclosure {that is lighted with a minimum 25 watt incandescent light bulb, able to operate with the main disconnect switch in the off or on position}.

1. Temperature Control. {Space Temperature Control. A solid-state temperature control system, located inside the control panel, shall have a sensing RTD located in the unit return air (room air) inlet plenum. The RTD senses and controls the room temperature in the occupied mode.
2. Optional DDC Items and/or control logic and screen displays (list here)
3. The High-Temperature Limit Switch. This switch turns the burner off when the discharge air temperature exceeds XXX° F. The burner must be manually reset at the heater.

- C. Provide a gas manifold sized for the rated BTU capacity of the heater and minimum and maximum inlet gas pressure, as scheduled on the drawings. The gas manifold will be constructed in conformance to:**

**ETL Design Certified to ANSI requirements  
{Factory Manual (FM) insurance requirements}  
{Industrial Risk Insurers (IRI) insurance requirements}**

- D. {Provide high and low gas-pressure switches. The high gas-pressure switch, to be located on the burner end of the manifold, shall turn the burner off when the gas pressure is too high. The maximum gas-pressure range will be from 3" W.C. to 21" W.C. (Factory Set at "W.C.). The low gas-pressure switch, to be located on the inlet end of the manifold, shall turn the burner off when the gas pressure is too low. The minimum gas pressure range will be from 3" W.C. to 21" W.C. (Factory Set at "W.C.).}**

### **2.3 Accessories (Select accessories as desired)**

**Manufacturer shall provide the following accessories:**

- A. Service Platform. The heater shall be furnished with a self-supporting service platform (field installed), running the full width of the heater, and shall include corrosion resistant 16-gauge multi-grip floor plate with an OSHA-approved handrail, kick-plates, and safety chains at each entrance end. {OSHA design type ladder to be provided by equipment manufacturer for field installation}.**
- B. Vibration Isolation of entire unit. Vibration isolators shall consist of {rubber-in-shear} {a steel housing with spring isolators}. Equipment base will be provided with angle clips to facilitate field installation of vibration isolators.**