Johnson Air Rotation® Systems

Johnson Air Rotation® System Specification for Heating

The heating system for the facility shall consist of a Johnson Air Rotation® System custom designed and manufactured by the Johnson MarCraft of St. Louis, Missouri. The equipment shall be located in the building per agreement between Johnson MarCraft and the end user.

GENERAL INFORMATION

The entire unit assembly and flue shall be approved, listed, and labeled by Underwriters Laboratories (UL®), and shall be manufactured and tested in a UL®-approved and certified Test Data Program.

The unit shall be manufactured to the standards of and approved by FM or IRI as designated by the owner or his agent.

AIR MOVER AND INLET MODULE

The Air Module expanded metal grill shall be custom designed by Johnson MarCraft to suit the individual unit location. The expanded metal grill shall be fabricated from 9-gauge steel.

The unit shall have a 25" x 39" lockable access door. A "Warning Placard" shall be affixed at the access door indicating that the unit is to be shut off before opening the door and entering the fan compartment.

The Air Module fans shall be equipped with dual belt drives with the drives selected for not less than 400% of the horsepower rating. All belts on the unit shall be of the industrial grip notch type selected for extended service life.

The sound level of the unit, when the fans are placed in operation, shall be less than 75 dBa when measured 10 feet from the unit at a 5 foot elevation.

Filters: (Type 1): Pleated type, average efficiency of 25% - 30%, with average arrestance of 90% - 92% in accordance with ASHRAE 52 Test Standard. Maximum Face Velocity: 500 fpm (2.54 m/s). Depth: 2" (51 mm) deep. UL Classification: Class 2. Filters: Non-woven cotton and synthetic fabric type manufactured by Farr, American Air Filter or Continental Filters. Filters shall be mounted in slide tracks at ground or floor level for ease of inspection and changing without access doors or other restrictions.

Filters: (Type 2): Washable aluminum mesh. Maximum Face Velocity: 600 fpm (3.05 m/s). Depth: 2" (51 mm) deep. Filters shall be mounted in slide tracks at floor or ground level for ease of inspection and changing without access doors or other restrictions.

Filters: (Type 3): Washable natural hair and vegetable fiber media. Maximum Face Velocity: 600 fpm (3.05 m/s). Depth: 1" (26 mm) deep. UL® Classification: Class 2.

Filters shall be mounted in slide tracks at floor or ground level for ease of inspection and changing without access doors or other restrictions.

POWER AND CONTROL PANELS

There shall be separate power and control panels. The power panel will contain all three-phase wiring. The control panel will be single-phase only, factory wired to the power panel providing a single point power installation.

There shall be a locking control cabinet with flame failure alarm horn, modulating temperature controls, and displaying pilot lights to indicate "power on", "call for heat", and "rear fan failure" light indicator.

The power panel shall have a locking dead front main power cabinet with disconnect and containing necessary fuses, sub-circuits, magnetic starters with 3-leg protection, relays, and control transformers.

The unit shall have a 24-hour 7-day clock and two thermostats per unit, day stat and night stat, mounted inside the control panel to allow for temperature setback during unoccupied periods. The sensors shall be mounted at the unit inlet to provide accurate readings.

The control panel shall contain an emergency shutdown circuit, which may be supervised by the fire protection system in the facility. At owner's option this can be accomplished with an external power source of either 120 volts or 24 volts.

The control panel shall contain a fan control switch allowing selection of continuous multiple fan operation, or an energy conservation-operating mode wherein one fan operates continuously and the other operates as required to be controlled by the temperature rise of the air being moved by the unit.

HEATER MODULE GAS

The primary furnace, rear header, tube sheets, and front collector box shall be manufactured of high temperature quality stainless steel.

The factory-mounted gas train shall be full modulation, low-high-off, or fixed gas operation. FM or IRI insurance requirements will designate individual gas train components.

The burner and heat exchanger shall be designed to allow for a flue the equivalent length of two 45-degree elbows and 30 feet of horizontal pipe run. If the flue design results in greater resistance, consult with Johnson MarCraft to determine what changes may be required.

The flue shall be supported independent from the unit flue gas outlet collar, and shall be UL® listed.

The flue shall be designed and furnished by the Air Rotation® System manufacturer and shall be gas tight, meet all applicable local codes, and shall be double-wall stainless

steel. The flue shall have an appropriate rain cap. See Johnson MarCraft drawing EDF-163-R2 for dimensional criteria.

The unit shall have a permanently mounted 3" dial gauge thermometer mounted in the front flue box assembly for monitoring flue gas temperature, and a port for a gas analyzer sensor.

The heater module shall have thermal insulation installed throughout.

HEATER MODULE OIL OR DUAL FUEL

The primary furnace, rear header, tube sheets, and front collector box shall be manufactured of high temperature quality stainless steel.

Fuel-fired units are capable of using #2 fuel oil. Units can be supplied with a combination burner using natural gas, propane, and #2 fuel oil.

Each unit shall be equipped with a separate oil atomizing pump motor and oil re-circulation loop to ensure an air free oil supply.

Multiple unit oil systems shall be designed to be supplied with oil by a one-pipe oil distribution system. Johnson MarCraft will supply specific recommendations for oil tank piping, oil distribution system piping, and unit supply piping.

The burner and heat exchanger shall be designed to allow for a flue the equivalent length of two 45-degree elbows and 30 feet of horizontal pipe run. If the flue design results in greater resistance, consult with Johnson MarCraft to determine what changes may be required.

The flue shall be supported independent from the unit flue gas outlet collar, and shall be UL® listed.

The flue shall be designed and furnished by the Air Rotation® System manufacturer and shall be gas tight, meet all applicable local codes, and shall be double-wall stainless steel. The flue shall have an appropriate rain cap. See Johnson MarCraft drawing EDF-163-R2 for dimensional criteria.

The unit shall have a permanently mounted 3" dial gauge thermometer mounted in the front flue box assembly for monitoring flue gas temperature, and a port for a gas analyzer sensor.

The heater module shall have thermal insulation installed throughout.

AIR OUTLET MODULE

The Air Outlet Module shall be custom designed by Johnson MarCraft to ensure appropriate air discharge at the designated location using both horizontal and vertical, adjustable louvers, to direct discharge.

The discharge shall include turning vanes to minimize static loss within the unit and to assist in the directional discharge. Turning vanes shall be designed to direct air toward each side of the unit discharge.

The unit shall be supplied with heat outlet extensions, which will be shipped to the jobsite as four flat panels to be bolted together at the jobsite. The outlet extensions will be designed to elevate the unit outlet as shown on the drawings, or above any obstructions in the space.

GENERAL COMMENTS

All flat panels used in unit manufacture shall be 18-gauge steel.

All solid panel portions of the air mover and inlet module shall have sound insulation installed.

All unit modules shall be assembled with flat bar screwed in place with either grill or solid panel. The grill and solid panel sections are easily removed to allow access to the interior of the unit.

Combustible materials may be placed or stored as close as 48 inches from the front side (burner side) and 18 inches from all other sides, including the top-side, of the entire unit assembly.

The unit manufacturer shall conduct sound testing in its manufacturing facility and certify that the Air Rotation® System operates at 75 decibels or lower, when measured 10 feet from the unit at a 5-foot elevation..

TECHNICAL FIELD SERVICE

Incidental to the sale of this equipment, the services of a factory trained Field Engineer will be provided at no added cost to supervise placing the System in operation and good adjustment. The Field Engineer will instruct the owner's personnel in equipment operation, and review maintenance procedures with the owner's qualified personnel or qualified representatives.