BANANZA®

BMA-Series

Equipment Specifications

1.800.255.3416

INTERTEK ETL CM LISTED C US

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. BANANZA® BMA-Series which can incorporate one of the following air control schemes:
- 100% outdoor air (MUA Style)
- Manual modulation of 0% - 100% outdoor air (FR Style)
- Automatic modulation of 0% - 100% outdoor air (AM Style)

2.2 MANUFACTURED UNITS

A. Unit: Constant volume [outdoor] [indoor] indirect-fired air handler.

2.3 FABRICATION

A. Casing and Components: Units to have a welded steel frame. The casing shall be constructed of a minimum of 16 gauge, cold rolled steel and the panels shall be fabricated into self-framing, standing seam type construction. The panels shall [form a self-framing casing] [be properly supported with welded structural angle, channel and tubular steel framework]. The exterior roof panels shall be a minimum of 16 gauge, cold rolled steel. The top wearing surface of the floor of each section shall be a minimum of 16 gauge, cold-rolled steel. The cabinetry of the heat exchanger section shall have internal heat shields to protect the exterior unit skin and allow air to travel between the exterior and the shield.

B. Fan Support: Fan housing(s) shall be welded to the casing and reinforced with structural angle or tubing to reduce vibration and sound.

C. Access Doors: Doors in the unit housing shall be provided to permit ready access to all internal components. The access doors shall be of 16 gauge cold rolled steel. The doors shall be designed to swing out with a hinge. The door shall be framed by the wall panels of the unit casing.

D. Outdoor Installation (Optional): A service vestibule shall encase the unit control panel, power burner and gas train. All joints and seams are to be caulked and weather proofed. All access doors to be fully gasketed. Roof panels shall be pitched (optional on BMA-35 through BMA-125; standard on BMA-150 through BMA-450).

E. Lifting Points: The lifting channels/tubes shall be provided on the base on the corners of each section of the air unit.

F. Finish: White air dry enamel is standard finish.

G. Observation Port: A permanent observation port shall be provided in the burner to allow observation of both the pilot and main flame.

2.4 POWER BURNER AND GAS TRAIN ([Gas][Oil[Gas/Oil Combination])

A. Burner: Furnish and install one [on/off gas burner] [high/low/off gas burner] [3:1 turndown gas burner] [8:1 turndown gas burner] [10:1 turndown gas burner] [on/off oil burner] [high/low/off oil burner] [fully-modulating oil burner] [on/off combination burner] [high/low/off combination burner] [fully-modulating combination burner]. The burner shall incorporate a stainless steel flame retention type combustion head. Combustion head shall be symmetrically round with internal gas pilot. Primary-secondary air control shall be a design function of the combustion head.

B. Burner Assembly/Gas Train: The gas train piping shall include a 1/4" NPT pressure tapping with 1/4" pipe plug upstream and downstream of valve and regulator in the gas train, one manually operated ball valve upstream of all valves, one main gas pressure regulator with vent, one safety shutoff valve which shall be proven closed during pre-ignition by proof of valve closure interlock switch on valve on FM gas trains over 5 million Btu/h input, primary and secondary automatic gas safety shutoff valves to operate simultaneously, manually operated gas valve which shall be located downstream of both automatic gas valves to permit leakage testing of the valves and [a normally open, fully ported, electrically operated valve shall be provided in a vent line connected between the two safety shut off valves.] The vent pipe shall be run outside to atmosphere. Electronic safety combustion controls shall be supplied complete with ultra-violet flame scanner to monitor the pilot and main flame. A programming relay shall be furnished. It shall be so utilized as to provide intermittent type gas electric ignition and pre-ignition purge timer.

C. Pilot: Automatic electronic ignition system.

D. Damper (Optional): Motorized with end switch to prove position before burner operation.

2.5 INDIRECT-FIRED HEAT EXCHANGER

A. Heat Exchanger: Heat exchanger drum and front header is to be made entirely from 409 stainless steel. The secondary heat exchange surfaces shall be made from [carbon steel] [stainless steel]. Heat exchanger is to incorporate primary surface drum and secondary surface tubes in a [three][four] pass design. Baffles are to be utilized to assure proper air distribution on the heat exchanger at low air volumes. The primary surface is to be no less than 16 gauge, the secondary tubes are to be no greater than 3" in diameter and no less than .055" wall thickness. The front and rear headers, as well as the intermediate headers are to be a minimum of 16 gauge. The front and rear collector boxes shall be a minimum of 8" deep. The front and rear collector boxes shall overhang the drum and include an integral directional baffle to direct air to cover the entire box as well as the box to tube joint.

PART 1 GENERAL [Gas][Oil][Gas/Oil Combo]-Fired

Provide units with heating and ventilating sections, designed and manufactured for indoor or outdoor installation. Units shall be packaged air handlers which include casing, [non-modulating][modulating] burner, primary and secondary heat exchangers, and non-overloading fan.

1.1 SECTION INCLUDES

A. Indirect-fired air handler

B. Controls

1.2 REFERENCES

A. American Society for Testing Materials (ASTM):
   1. Standard A653/653M; Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process

B. ETL Testing Laboratories, Inc. (ETL):
(Nationally recognized testing laboratory certifies code conformance.)
   1. Requirements applicable to product labeling and listing in the Directory of ETL Listed Products.

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

D. Industrial Risk Insurance (IRI):
(Certifies gas manifold to owner's insurance carrier.)

E. National Electrical Manufacturers Association (NEMA):
   1. Standard 250; Enclosures for Electrical Equipment (1000 V Maximum)

F. National Fire Protection Association (NFPA):
(Establishes fire prevention standards.)
   1. Article 54; National Fuel Gas Code
   2. Article 70; National Electric Code
   3. Article 31; Standard for Installation of Oil-Burning Equipment
   4. Article 33; Standard for Spray Application Using Flammable or Combustible Materials
   5. Article 86; Standard for Ovens and Furnaces

G. National Roofing Contractors Association (NRCA):
   1. The NRCA Roofing and Waterproofing Manual, Second Edition

H. Occupational Safety and Health Administration (OSHA):
(Enforces air quality standards and safety in the workplace.)

I. Underwriters Laboratories, Inc. (UL):
(Nationally recognized testing laboratory certifies code conformance, product labeling and listing.)
   1. Standard UL727 Standard for Oil-Fired Central Furnaces
   2. Standard UL731 Standard for Oil-Fired Unit Heaters
   3. Standard UL795 Standard for Commercial-Industrial Gas Heating Equipment

1.3 SUBMITTALS FOR REVIEW

A. Product Data: Provide data with dimensions, duct and service connections, accessories, controls, electrical nameplate data and wiring diagrams.

B. Submittal Drawings: Indicate dimensions, duct and service connections, accessories, controls, electrical nameplate data and wiring diagrams.

1.4 SUBMITTALS FOR INFORMATION

A. Manufacturer's Instructions: Indicate rigging, assembly and installation instructions.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Project Record Documents: Record actual locations of remote sensors, control panels and other components.

B. Operation and Maintenance Data: Include manufacturer's Installation, Operation and Service Manual.

C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in owner's name and registered with the manufacturer.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section (proportional, building pressure controlling, modulating indirect-fired air handler) with a minimum of ten years documented experience. Equipment shall be the standard product of the manufacturer and shall have complete cataloged data.

B. Installer Qualifications: All installation and service of indirect-fired air handlers must be performed by a contractor qualified in the installation and service of said products with proof of a minimum of three years documented experience.

C. Factory Testing: Each air handler shall be factory-tested. Testing shall consist of checking all circuits for continuity, operability of all valves, control motors, fan speed, linkages, switches and burner. Each air handler shall be test-fired for minimum and high fire conditions. See "Fan and Motor" for additional fan testing requirements.

1.7 REGULATORY REQUIREMENTS

A. Conform to the National Fuel Gas Code (NFPA 54/ANSI Z223.1).

B. Conform to required or specified insurance specifications (FM, IRI, etc.) for the gas manifold construction.

1.8 WARRANTY

A. The product shall have a manufacturer's limited warranty of at least 24 months, subject to the manufacturer's standard warranty limitations.

2.6 FANS AND MOTORS

A. Fan: The fan(s) shall consist of centrifugal, [forward curved] [backward inclined or air foil] double-width, double-inlet (DWDI) blower wheels and scrolls. The blower assembly shall be dynamically balanced. Blower shafts shall be of tubular design. The shafts shall not pass through their first critical speed when the unit comes up to the rated RPM. Shaft shall be coated with a rust inhibitor.

B. Drive: All V-belt drives shall be standard capacity, with reinforced rubber belts. Drives are mounted outside the airstream. The sheaves shall be of a cast iron type. Standard drive sheaves are [adjustable with a plus or minus 7% adjustability on 10HP motors and smaller] [fixed pitch type on 15HP motors and larger]. The service factor used for V-belt drives shall be not less than 1.25. An adjustable motor base shall provide variation in center distance and shall be readily adjustable by means of screw adjustments. A locking nut, or similar device, shall be provided to secure the base in proper position.

C. Fan Bearings: Blower wheels shall be supported by [two][three] [four] outboard bearings which shall be of a self-aligning, ball bearing type and shall have an ABMA L10 rated life of 100,000 hours.

D. Motor: Motor shall be [ODP], [TEFC], [explosion proof], [high efficiency], 1800 RPM, [1 Ø][3 Ø], 60 Hz, wired for the selected voltage. Motor horsepower shall be as indicated on the schedule. All 3 Ø motors shall be controlled and protected by an automatic starter with thermal overload protection. Starter shall be interlocked to prevent burner operation when overload relays are tripped. Motors are mounted outside the airstream.

2.7 CONTROL SYSTEM

A. Factory Testing: The off/low-fire/high-fire operation of the burner shall be controlled by means of a temperature control.

B. Control Enclosure: A factory pre-wired control cabinet shall be supplied with the burner. Cabinet is mounted on or near burner. Cabinet to house the flame safeguard control, programming purge timer, burner motor starter, fuses, control switches and relays. The unit shall be provided with an integral weatherproof control panel with 115 volt control transformer, fuses, terminal strip, and motor starter with overload protection. Fan/blower motor(s) will be wired to the motor starter(s).

C. Disconnect Switch (Optional): A unit disconnect switch shall be provided [on the exterior of the unit for single point wiring connection][loose].

D. Flame Relay: A manual restart of the burner shall be necessary in the event of shutdown due to flame failure.

E. Safety Controls:

1. High Gas Pressure: The high gas pressure switch shall turn the burner off when the gas pressure is above its setpoint. The maximum gas pressure shall be set at 1" above the maximum gas pressure at high fire.
2. Low Gas Pressure: The low gas pressure switch shall turn the burner off when the gas pressure is below its setpoint. The minimum gas pressure shall be set at 7" w.c..
3. High Temperature Limit Switch: A manual reset high temperature switch shall turn the burner off when air is discharged above its setpoint. The high temperature limit switch shall be factory set at 200° F.

F. Electronic Controls System:

1. Temperature Controller: Provide with either discharge temperature or room temperature controller.
2. Remote Control Panel (One for Each Unit): Mount unit operating switch and Remote Panel lights, as follows:

- Including Summer/Off/Winter switch, Blower on/off light, Burner on/off light, flame failure light (standard) and room temperature thermostat (optional).
- Night setback with Occupied/Unoccupied switch, seven-day mechanical timeclock or seven-day electronic timeclock (optional).
- Unit mounted on/off toggle switch (optional).
- Clogged Filter light (optional).
- Burner alarm horn (optional).
- Burner on/off outdoor air thermostat (optional).
- Fan on/off low-limit control with bypass timer (optional).

2.8 AIR HANDLER OPTIONS AVAILABLE (Select Applicable Options)

A. Roof Curb: [Burner/blower sections only] [full perimeter] roof curb available in height of [16"] [24"]. Curbs shall be manufactured of minimum 14 gauge galvanized steel with all the hardware for bolt-together assembly. Curb is to be a minimum of 16" high.

B. Inlet Hood: Hood shall be manufactured of a minimum of 16 gauge steel. A galvanized birdscreen is to be supplied. Air velocities at wind resistant angled intake are not to exceed velocities which would approach water carry-over.

C. Insulation: (Optional): Insulation shall be 1", 1.5 lb. per sq. ft. rigid, rot-proof, non-combustible glass fiber insulation. Mount insulation in roof, sides, floors, interior partitions and all service doors of [burner/blower section only] [entire unit]. Insulation shall be matte-faced when in single wall application.

D. Discharge Head: The manufacturer shall provide an adjustable, double-deflection discharge head for units with a horizontal discharge. Units with a bottom discharge shall be provided with an adjustable, four-way plenum.

E. Filter Section: Standard filter section constructed shall be V-bank style, with disposable or cleanable filters. Filter type options include but are not limited to: permanent aluminum mesh, fiberglass throw-away, pleated-panel polyester rated at 30% filtration efficiency or flat-panel polyester rated at 30% filtration efficiency.

F. Service Platform: Each air handler shall be furnished with a minimum 48" deep service platform running the full width of the air handler. The platform shall be constructed with a minimum 1" thick grating, an OSHA-Approved hand rail on three sides and steel safety chains on the remaining sides. Ladder access to be provided by others.

G. Smoke Detector: A smoke detector shall be provided to shut off air handler if smoke is detected.

H. Carbon Dioxide (CO_2) Detector: A room-mounted carbon dioxide sensor shall be provided for initiating additional outdoor ventilation.

I. Mixing Section (Optional): The mixing box shall be provided with opposed-blade return air and fresh air dampers with modulating actuator(s). The mixing box shall be capable of 0-100% fresh air to return air ratio. Standard damper control shall be controlled by a potentiometer. A photohelic shall be provided for automatic control of the dampers based on building pressure (optional).

2.9 PERFORMANCE

A. See Schedule on plans.

PART 3: EXECUTION

3.1 INSTALLATION

A. The unit shall be started per the instructions in the Installation, Operation, and Service Manual by the installing contractor. A factory provided field start up form shall be filled out by the contractor and mailed to the manufacturer. The start-up shall include, but not be limited to:

- Verification of proper supply power and fuel.
- Verification that electrical terminals are secure.
- Proper air flow balance.
- Verification of combustion efficiency and proper burner adjustments
- Testing of all safety and operating controls.
- Setting of [High and Low][Modulation] fire.

B. One copy of the Installation, Operation, and Service Manual shall be enclosed in the unit control panel. The manual shall consist of recommended installation procedures and guidelines, inspection, initial start-up, operating, maintenance and troubleshooting sections.

3.2 SCHEDULES

A. See plans.

Thank You for Your Business!

Installation Code and Annual Inspections:
All installations and service of BANANZA® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Bananza and conform to all requirements set forth in the BANANZA® manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment. To help facilitate optimum performance and safety, Bananza recommends that a qualified contractor annually inspect your BANANZA® equipment and perform service where necessary, using only replacement parts sold and supplied by Bananza.

Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through BANANZA® representatives. Please contact us for any further information you may require, including the Installation, Operation and Service Manual.

This product is not for residential use.

This document is intended to assist licensed professionals in the exercise of their professional judgement.

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