Direct-Fired **Air-Turnover** Indirect-Fired Infrared Unit Heaters Duct Furnaces Cooling

7500-Series

Rapid™ Engineering

Indirect-Fired Air Turnover Units
Equipment Specifications

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RAPID™ 7500-Series Indirect-Fired Air Turnover Unit Guide Specification

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

Provide units with heating and ventilating sections, designed and manufactured for indoor installation. Unit shall include burner, primary combustion chamber and secondary heat transfer surfaces, mechanical combustion system, fan and motor assembly, sheet metal casing and safety devices.

1.1 SECTION INCLUDES

A. Indirect-fired air turnover unit

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):
(Ensures compliance of gas manifold to owner's insurance carrier.)

D. Industrial Risk Insurance (IRI):
(Ensures compliance of 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 operating instructions, installation instructions, maintenance data, and parts listing.

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 (indirect-fired air turnover units) 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 turnover units 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 turnover unit 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 turnover unit 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.

PART 2: PRODUCTS

2.1 MANUFACTURER

A. RAPID™ 7500-Series

2.2 MANUFACTURED UNITS

A. Unit: Constant volume indoor indirect-fired air turnover unit.

2.3 FABRICATION

A. Casing and Components: Casing shall be constructed of 16 gauge steel or heavier and properly supported with welded structural angle, channel and tubular steel. Exterior panels shall be 16 gauge galvanized 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 skin. All cabinetry framework shall be structural and thoroughly degreased.

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. Finish: Unpainted galvanized is standard finish.

D. 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, 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. Optional - Electronic safety combustion controls shall be supplied complete with ultra-violet flame scanner or flame rod to monitor the pilot and main flame. A programming relay similar shall be furnished. It shall be so utilized as to provide intermittent type gas electric ignition and pre-ignition purge timer.

C. Pilot: Automatic electric ignition system.

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.

2.6 FAN(S) AND MOTOR(S)

A. Fan: The fan(s) shall consist of a propeller fan.

B. Drive: All V-belt drives shall be standard capacity, with reinforced belts. The sheaves shall be of a cast iron type. Standard drive sheaves are adjustable. An adjustable motor base shall provide variation in center distance and shall be readily adjustable by means of screw adjustments.

C. Motor: Motor shall be [ODP] [TEFC], [explosion proof], [standard efficiency], [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.

2.7 CONTROL SYSTEM

A. Factory Testing: The 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 to house the flame safeguard control, programming purge timer, burner motor starter, fuses, control switches and relays. The unit shall be provided with a 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. 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 discharge temperature or room temperature sensing controller.
2. Remote Control Panel (Optional): Includes Summer/ Off/Winter switch and operating lights.

2.8 AIR HANDLER OPTIONS AVAILABLE (Select Applicable Options)

A. Extensions: Extensions available in 48" high sections. Extensions shall be manufactured for bolt - together assembly.

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

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

2.9 PERFORMANCE

A. See Schedule on plans.

PART 3: EXECUTION

3.1 INSTALLATION

A. The unit shall be installed and started in strict accordance with applicable governmental regulations and the Installation, Operation and Service Manual by a contractor qualified in the installation of the manufacturer's product.

B. Install per NFPA 54 (ANSI Z223.1) by providing connection to fuel gas systems.

C. Units which are shipped in multiple sections shall be assembled on the job site by installing contractor. Assembly includes extending electrical power and network control wires to the terminals provided and reconnecting the motor and control wiring between sections to create a complete and operable installation (per air turnover unit manufacturer's recommendations).

D. Contractor shall provide a proper gas service drip leg and a lockable, lever handle manual shutoff valve. A high pressure regulator shall be installed if manifold pressure will exceed 1 psig.

E. Furnish Division 16 (Electrical) Contractor with field wiring diagram and electrical data to permit power wiring connections to the unit.

F. Installation contractor is to provide equipment check, test and commissioning in strict accordance with manufacturer's instructions.

G. Provide the owner's operating personnel with instruction on proper use of the air turnover unit and controls.

H. Contractor shall install carbon monoxide / nitrogen dioxide sensors in the vicinity of the source contaminant (e.g., an operating vehicle), preferable at the breathing level of the occupants. Do not install sensors in confined ("dead") spaces.

I. Installation shall take place within three months following date of shipment of product manufacturer.

3.2 SCHEDULES

A. See plans.

Thank You for Your Business!

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

Further Information: Applications, engineering and detailed guidance on systems design, installation and product performance is available through RAPID™ representatives. Please contact us for any further information you may require, including the Installation, Commissioning, 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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