Weather-Rite LLC

TT-Series
Direct-Fired Air Handlers

Equipment Specifications

1.800.589.3691
www.weather-rite.com

INTERTEK ETL LISTED C US

CANADA: 100% OUTSIDE AIR ONLY

PART 1 GENERAL

Please note: Brackets indicate required choices to be made in preparation of the final specification.

Provide units with gas-fired heating and ventilating sections, designed and manufactured for indoor or outdoor installation. Units shall be packaged air handlers which include casing, modulating burner, non-overloading fan, mixing chamber (AM and VAV Models only) and positive position modulating return air dampers (AM and VAV Models only).

1.1 SECTION INCLUDES

A. Direct-fired air handler

B. Controls

1.2 REFERENCES

A. American National Standards Institute (ANSI): (Establishes requirements applicable to certifying direct gas-fired heaters.)
   1. MUA Model: Standard Z83.4; Non-Recirculating Direct Gas-Fired Industrial Air Heaters
   2. AM, VAV Models: Standard Z83.18; Recirculating Direct Gas-Fired Industrial Air Heaters

B. 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

C. 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.

D. Factory Mutual Insurance (FM):
(Ensures compliance of gas manifold to owner's insurance carrier.)

E. Industrial Risk Insurance (IRI):
(Ensures compliance of gas manifold to owner's insurance carrier.)

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

G. National Fire Protection Association (NFPA):
(Establishes fire prevention standards.)
   1. Article 54; National Fuel Gas Code
   2. Article 70; National Electric Code
   3. Article 90A; Installation of Air Conditioning and Ventilating Systems

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

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

J. Underwriters Laboratories, Inc. (UL):
(Nationally recognized testing laboratory certifies code conformance, product labeling and listing.)
   1. Standard UL916 Energy Management Equipment
   2. Standard UL873 Temperature Indicating & Regulating Equipment

1.3 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals

B. Product Data and Submittal Drawings: Provide data with dimensions, duct and service connections, accessories, controls 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 of direct-fired air handlers with fifty years documented experience. Equipment shall be the standard product of the manufacturer.

B. Installer Qualifications: All installation and service of direct 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 Section 2.6 Fan and Motor for additional fan testing requirements.

1.7 REGULATORY REQUIREMENTS

A. Conform to ANSI Standards Z83.18 or Z83.4 (latest revision) and provide evidence that the air handler and its control system have been found in compliance as a system with these standards by a nationally recognized testing laboratory.

B. Conform to NFPA 90A.

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

D. 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

1.9 EXTRA MATERIALS

A. Section 01700 - Contract Closeout

B. Section 01730 - Operation and Maintenance Data

PART 2 PRODUCTS

2.1 MANUFACTURER

A. WHEATHER-RITE™ TT-Series, incorporating one of the following outdoor air control schemes, as specified herein or shown on the plans:
- 100% outdoor air (MUA Model)
- 20% - 100% outdoor air (AM Model)
- 20% - 100% variable air volume (VAV Model)

2.2 MANUFACTURED UNITS

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

2.3 FABRICATION

A. Casing and Components: Heavy gauge cold-rolled steel enclosure, welded to a steel angle frame. The panels for outdoor units shall be stitch welded and caulked at the seams to provide a watertight enclosure.

B. Fan Support: The fan and bearings shall be supported by a reinforced steel framework independent of the cabinet.

C. Access Doors: Neoprene-gasketed doors shall be provided to allow easy service of all critical components, controls and fan.

D. Outdoor Installation: Units installed outdoors shall utilize weatherproof construction with an intake hood or plenum.

E. Lifting Points: Internal members shall be properly sized to allow rigging and handling of the unit from the top.

F. Finish: All cabinet surfaces inside and out shall be cleaned of oil and grease, treated with a rust-inhibiting, iron phosphate surface coating and then followed by a passivating rinse. All exterior surfaces of the cabinet and any uncoated steel surfaces within shall be painted with a high quality prime and finish coat of rust-inhibiting, machinery grade enamel.

G. Observation Port: Provide on burner section for observing main and pilot flame operation.

2.4 BURNER AND GAS TRAIN

A. Burner: Specially designed to burn natural or propane gas at or below the non-contaminating levels required by ANSI and OSHA. The burner shall have a cast iron manifold and heat resistant Type 430 stainless steel burner plates. The burner shall have a nominal 30:1 turndown ratio and be designed for 100% combustion efficiency for the life of the equipment.

B. Burner Profile: The outdoor air velocity across the burner on all constant volume designs shall be controlled by fixed burner profile plates. The design of the unit profile plates shall maintain manufacturer's specified air velocity at all times over the burner during operation. No air from the occupied space shall be allowed to recirculate across the burner at any time.

C. Burner Assembly / Gas Train: The burner assembly and fuel piping arrangement shall include automatic ignition controls, [UV scanner flame detection system][flame rod], low pressure gas regulator, fully modulating gas control valve, primary and secondary automatic shutoff valves and manual shutoff valve. Pilot gas controls shall include a pilot regulator, normally-closed solenoid shutoff valve, needle valve, high gas pressure switch and manual shutoff valve. Gas train shall be sized to provide full unit capacity at specified inlet pressure to the gas train. Provide and install a supplementary pressure regulator at each unit as necessary to maintain unit inlet pressure at less than 5 psig.

D. Pilot: Electric spark ignition through an ignition transformer.

E. Damper (Optional on MUA style air handlers):
Motorized with end switch to prove position before burner will fire.

2.5 ELECTRIC COIL (OPTIONAL)

A. An electric coil can be substituted for a direct-fired burner, if required. Specification provided by factory.

2.6 FAN AND MOTOR

A. Fan: Double width, double inlet (DWDI), forward curved fan, belt driven for the specified air capacity. Blower wheel, shaft and drive sheaves shall be both statically and dynamically balanced. Each fan and drive combination shall be dynamically balanced during testing at the factory to .1" per second or less equivalent displacement.

B. Drive: The fan shaft shall be connected to the motor by a multiple V-belt drive designed to exceed the motor name plate capacity. The fan wheel and bearings shall be supported by reinforced structural steel framework independent of the unit housing. The motor sheave shall be a fixed design for motors larger than 10.0 HP.

C. Fan Bearings: Self-aligning, pillow block or flange type and shall have (for external static pressure less than 1" w.c.) an ABMA L10 rated life of 100,000 hours and be equipped with optional extended lubrication lines. Extended lubrication lines shall be terminated at the unit's outer skin so that all lubrication can be performed without shutting down the system.

D. Motor: The motor shall be an [ODP] [TEFC], [premium efficiency] [standard efficiency] design with minimum service factor of 1.15, wired for the selected voltage, 1750 rpm, standard NEMA frame and mounted on an adjustable slide base.

E. Sound Power: The fan sound power shall not exceed 85 dBA at a distance of ten feet from the air handler discharge opening.

2.7 CONTROL SYSTEM

A. Factory Testing: The complete control system and all burner and gas manifold functions shall be factory tested for proper operation and to simplify field commissioning.

B. Control Enclosure: The unit control enclosure shall have weather-resistant construction with a hinged door. The control enclosure shall contain the gas train and all principal electrical components, including, motor starter, fused disconnect switch, 120 V and 24 V transformers, control circuit fuses, control relay(s), [circuit check lights][pressure transducer], flame relay and full number-coded terminal strip.

C. Flame Relay: The air handler control panel shall have a burner flame relay to lock out the flame in abnormal conditions.

D. Safety Controls
1. High Gas Pressure: The high gas pressure switch, located on the burner end of the manifold, shall turn the burner off when the gas pressure is above its setpoint. The maximum gas pressure shall be selectable between 3" w.c. and 21" w.c.

2. Low Gas Pressure: The low gas pressure switch, located on the inlet end of the manifold, shall turn the burner off when the gas pressure is below its setpoint. The minimum gas pressure shall be set at 3" w.c.
3. Air Flow: The air flow switches measure air pressure differential across the burner to assure proper air flow during burner operation and prior to ignition. It shall be factory set at 0.2" w.c. for the low setting and 1.35" w.c. for the high setting.
4. High Temperature Limit: A manual reset high temperature switch shall turn the burner off when air is discharged above its set point. The High Temperature Limit Switch shall be factory set at 150°F.

E. Conventional Electronic Controls System:
1. Temperature Controller: Provide amplifier with room temperature control, room temperature sensor and discharge air temperature sensor.
2. Pressure switch: Provide a null position pressure switch for controlling the mixing dampers.
3. Pilot (Indicating) Lights (Optional): Install UL labeled lights inside panel door to indicate operation of control components as follows:
   - Power on
   - Low temperature limit switch
   - Power to fan starter
   - Fan on
   - High temperature limit switch
   - High gas pressure switch
   - Low gas pressure switch
   - Fan airflow switch
   - Pilot valve
   - Main valve
4. Remote Control Panel (one for each unit): Mount unit operating switches and pilot lights, as follows:
   - Solid state temperature control system.
   - Occupied and unoccupied switches and room temperature thermostats (optional).
   - Programmable electronic 7 day time clock with minimum of 4 on/off schedules per day and emergency battery power source (optional).
   - Burner alarm horn (optional).
   - SUMMER/OFF/WINTER switch.
   - Pilot lights for fan, burner, and burner failure.

2.8 AIR HANDLER OPTIONS AVAILABLE [Select Applicable Options]

A. Roof Curb: [16"] [24"] high curb, formed of minimum 12-gauge galvanized steel as required to support the unit, designed to support [burner/blower sections] [burner/blower/filter sections].

B. Light and Receptacle**:** Control panel service light and a 120 V duplex, manual reset, GFCI receptacle. The light and duplex receptacle shall be located at the air handler's control panel and powered through a line voltage 120 V, 750 VA, heavy duty, machinery grade transformer wired from utility side of main air handler disconnect switch.

C. Inlet Hood (Recommended for inlet velocities not exceeding 600 fpm at face of hood): The inlet hood shall mount on the outdoor air intake of the air handler and be constructed of sheet metal painted to match color of unit.

D. Dampers:16 gauge, galvanized steel with frame supporting damper blades to prevent twisting and flexing; friction free bearings; operator located outside of air stream.

E. Insulation: The roof and walls of the cabinet shall be completely lined with 1", 1.5 lb density, neoprene coated, glass fiber insulation, which complies with UL181 for erosion and NFPA 90A for fire resistivity. The insulation shall be secured via adhesive and mechanical pin fasteners per SMACNA standards. All exposed edges shall be coated to prevent erosion.

F. Discharge Head(s): The head shall include adjustable, locking**,** horizontal deflection blades for control of discharge airflow direction (optional vertical blades available).

G. Outdoor Air Filter Section: The outdoor air (only) is filtered. All filters can be changed from a single location.

H. Filter Status Indication: Each filter section is provided with an indicator light mounted on the face of the remote.

I. Filters: 2" thick, treated on leaving side, linked polyester media. (Other filtration options available.)

J. Service Platform: 46" deep service platform running the full width of the air handler. The platform shall be constructed with minimum 1" thick galvanized grating, an OSHA approved handrail on three sides and steel safety chains on the remaining side.

K. Vibration Isolators: Vibration isolators shall utilize a steel housing and an isolation element which is oil-resistant neoprene. (Other filtration options available.)

L. Smoke Detector. An ionization type supply air smoke detector which shuts off the air handler if smoke is detected.

M. Interlocking Relay: Provided for field interface with remote devices.

N. CO Detector: A room-mounted carbon monoxide sensor for initiating Flush or Exhaust modes.

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

P. NFPA 79 Wiring: All wiring to NFPA 79 standards.

Q. Pressure Gauges: Inlet and outlet pressure gauges are provided for each gas manifold. (nominal 5 psig and 10" w.c. spans)

R. Additional NEMA Starters: As required by equipment schedules, mounted in control enclosure (fed by main air handler disconnect).

S. Marine Light: One light in each specified air handler section.

2.9 PERFORMANCE

A. See schedule on plans.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install equipment in strict accordance with manufacturer's instructions.

B. Install per NFPA 90A.

C. Install per NFPA 54 (ANSI Z223.1) Provide connection to fuel gas system; refer to Section 15410.

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

E. Contractor shall extend pressure sensing tubes to inside and to outside of building as recommended by the air handler manufacturer.

F. 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 5 psig.

G. Furnish contractor with field wiring diagram and electrical data to permit power wiring connections to the unit.

H. Provide equipment check, test and commissioning by a factory trained and authorized service technician. Provide a copy of the start-up report to the customer.

I. Provide the owner's operating personnel with instruction on proper use of the air handler and controls.

J. Contractor shall supply all necessary hanger rods and install the discharge head or plate (if provided) in accordance with manufacturer's instructions.

K. Contractor shall level the roof curb and install a cant strip and wood nailer per applicable details on the plans.

L. 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.

M. The air handler shall be either an upright or horizontal design as shown on the plans and designed to be supported (e.g., legs, suspension by rods, structural platform, etc.) as shown on the plans.

3.2 SCHEDULE

A. See schedule on plans.

Thank You for Your Business!

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

Further Information: Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through WEATHER-RITE™ 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.

Weather-Rite LLC
616 North 5th Street
Minneapolis, MN 55401
Telephone: 612.338.1401
Fax: 612.338.6783
Toll Free: 1.800.589.3691
www.weather-rite.com

Printed in U.S.A. WRTTESNA 1.5M 0308 Orig