ABOVEAIR TECHNOLOGIES RT-OA GUIDE SPECIFICATION

1. GENERAL
	* + 1. SUMMARY
				1. Section includes custom-packaged, **[air-cooled]** **[water-cooled]** outdoor air conditioning units (RTUs) with the following components and accessories:

Cabinet.

Fans.

Motors.

Total Energy Recovery Wheel.

Coils.

Direct Expansion DX System.

Gas Furnace.

Electric Heat.

Humidifier.

Air Filtration.

Dampers.

Controls.

Electrical Power Connections.

Roof Curbs.

Accessories.

* + - 1. DEFINITIONS
				1. ECM: Electronically commutated motor.
				2. Exhaust (Relief) Air: Air taken from the conditioned space and blown to the outdoors. This air offsets the pressurization caused by outdoor air and is used by the energy recovery wheel.
				3. Exhaust Air Fan: The fan removing exhaust air from the conditioned space.
				4. Outdoor Air: Air taken from the outdoors and not previously treated or cycled through the system.
				5. Outdoor Air Refrigerant Coil: The refrigerant coil exposed to ambient air. The coil rejects heat during cooling operation and absorbs heat during heating operation.
				6. Supply Air: Conditioned air delivered to the space by the RTU.
				7. Supply Air Fan: The fan providing supply air to the conditioned space.
				8. Supply Air Refrigerant Coil: The refrigerant coil located in the supply air stream. The coil absorbs heat from the air stream (cools the supply air) during cooling operation and rejects heat to the air stream (heats the supply air) during heating operation (heat pumps only).
			2. RELATED DOCUMENTS
				1. Drawings, general provisions of the contract, and Division 01 Specification Sections apply to this section.
				2. Coordinate all work with applicable Division 23 and Division 26 Specification Sections.
				3. Refer to MC-Control Specification sequences and sensors.
			3. SUBMITTALS
				1. Submit documentation as required under Division 01.
				2. Product Data: Manufacturer’s technical data for each product to be used, including rated capacities, dimensions, furnished specialties, and accessories.
				3. Shop Drawings: Include details of equipment assemblies, including dimensions, weights, required clearances, components, and locations of field connections.
				4. Maintenance and operation information and instructions.

Latest IOM information always available at www.aboveairioms.com.

* + - 1. QUALITY ASSURANCE
				1. Comply with requirements of authorities having jurisdiction and all applicable codes at the location of the project.
				2. Manufacturer Qualifications: Minimum 10 years’ experience manufacturing similar products.
				3. Installer Qualifications: Minimum 2 years’ experience installing similar products.
			2. RECEIVING AND STORAGE
				1. Inspect product immediately upon delivery, note and report any damage or missing components.
				2. Handle the product in a manner to avoid damage at all times.
			3. WARRANTY
				1. Provide manufacturer’s standard limited warranty: 1 year.

Compressors: **[One]** **[Five]** years.

Gas Heat Exchanger: **[One]** **[Five]** **[Ten]** years.

1. PRODUCTS
	* + 1. SYSTEM DESCRIPTION
				1. RT-OA series **[air-cooled]** **[air-cooled]**, custom-packaged RTUs. **[Rooftop]** **[and]** **[grade-level]** mounted units with **[bottom]** **[side]** supply and return connections.
			2. MANUFACTURERS
				1. Manufacturers:

 AboveAir Technologies, located at 5179 Mountville Road, Frederick, MD 21703; Tel (301) 874-1130; [www.abovair.com](http://www.abovair.com); sales@aboveair.com

* + - * 1. Substitutions: Not permitted.
			1. CUSTOM-PACKAGED OUTDOOR HVAC EQUIPMENT.
				1. Design Capacities:

Supply Air Fan

Airflow: **<Insert Value>** CFM.

External Static Pressure: **<Insert Value>** inches w.g.

Motor Power: **<Insert Value>**.

Exhaust Air Fan

Airflow: **<Insert Value>** CFM.

External Static Pressure: **<Insert Value>** inches w.g.

Motor Power: **<Insert Value>**.

Energy Recovery Wheel

Summer Entering Exhaust Air Dry Bulb Temperature: **<Insert Value>** deg F.

Summer Entering Exhaust Air Wet Bulb Temperature: **<Insert Value>** deg F.

Summer Entering Outdoor Air Dry Bulb Temperature: **<Insert Value>** deg F.

Summer Entering Outdoor Air Wet Bulb Temperature: **<Insert Value>** deg F.

Summer Recovered Capacity: **<Insert Value>** Btu/h.

Summer Effectiveness: **<Insert Value>**.

Winter Entering Exhaust Air Dry Bulb Temperature: **<Insert Value>** deg F.

Winter Entering Exhaust Air Wet Bulb Temperature: **<Insert Value>** deg F.

Winter Entering Outdoor Air Dry Bulb Temperature: **<Insert Value>** deg F.

Winter Entering Outdoor Air Wet Bulb Temperature: **<Insert Value>** deg F.

Winter Recovered Capacity: **<Insert Value>** Btu/h.

Winter Effectiveness: **<Insert Value>**.

Supply Air Refrigerant Coil

Total Cooling Capacity: **<Insert Value>** Btu/h.

Sensible Cooling Capacity:  **<Insert Value>** Btu/h.

Entering Air Dry Bulb Temperature: **<Insert Value>** deg F.

Entering Air Wet Bulb Temperature: **<Insert Value>** deg F.

Outdoor Air Refrigerant Coil <Air-Cooled Configurations, Delete if not required.>

Ambient Air Temperature: **<Insert Value>** deg F.

Airflow: **<Insert Value>** CFM.

Number of Fans: **<Insert Value>**.

Motor Power: **<Insert Value>**.

Water-Cooled Refrigerant Coil <Water-Cooled Configurations, Delete if not required.>

Entering Water Temperature: **<Insert Value>** deg F.

Water Flow Rate: **<Insert Value>** GPM.

Glycol Type: **[Ethylene]** **[Propylene]**.

Glycol Concentration: **<Insert Value>** %by Volume.

Hot Gas Reheat Coil

Heating Capacity: **<Insert Value>** Btu/h.

Gas Furnace <Option, Delete if not required.>

Input: **<Insert Value>** Btu/h.

Output: **<Insert Value>** Btu/h.

Gas Type: **[Natural Gas]** **[Propane]**.

Electric Heat <Option, Delete if not required.>

Capacity: **<Insert Value>** kW.

Controls

Control Type: **[Primary Space]** **[Variable Air Volume]** **[Neutral]** **[By Others]**.

Single Point Power Connection

Voltage: **<Insert Value>**.

Phase: **<Insert Value>**.

Hertz: **<Insert Value>**.

Full Load Amperes: **<Insert Value>**.

Minimum Circuit Ampacity: **<Insert Value>**.

Maximum Overcurrent Protection: **<Insert Value>**.

* + - * 1. Performance requirements:

UL compliance: UL Standard 1995, Intertek (ETL) listed.

NFPA compliance: Compliance with NFPA 90A or 90B.

* + - * 1. Cabinet

Evaporator compartment:

Construction: Double-wall insulated panels, with joints between sections sealed.

Double-wall construction: Space between panel faces filled with 2-inch insulation and sealed for R-13 performance.

Exterior panels: Powder‐Coat Painted Steel, Double Wall

Interior panels: Galvanized Steel

Access doors: Factory-installed, Powder‐Coat Painted Steel, hinged, double-wall access doors with quarter-turn latching handles, guard, and tight air and water seal.

Base rail: Heavy gauge steel with rigging holes at corners.

Air pattern: **[Bottom]** **[Side]** discharge.

Condensing compartment:

Construction: Single-wall panels

Exterior panels: Powder‐Coat Painted Steel with factory painted finish.

Hail guard.

**[Split Condensing Section]**.

* + - * 1. Fans

Supply fan:

Type: **[Variable-]** **[Constant-]** speed backward-inclined, high-efficiency impeller.

Motor: Direct drive, EC.

Statically and dynamically balanced

Inlet cone and externally mounted rotor motor.

Safeties: Air proving switch, integral over-temperature protection.

Exhaust fan <Option, Delete if not required.>:

Type: **[Variable-]** **[Constant-]** speed backward-inclined, high-efficiency impeller.

Motor: Direct drive, EC.

Statically and dynamically balanced

Inlet cone and externally mounted rotor motor.

Safeties: Integral over temperature protection.

Condenser fan(s):

Type: Variable-speed axial fan.

Motor: Direct drive, EC.

Statically and dynamically balanced.

Safeties: Integral over temperature protection.

* + - * 1. Motors:

Motor sizes: As indicated herein, or such that the motor will not be required to operate in service factor range above 1.0.

Service Factor: 1.15.

Motor Bearings: Maintenance free, permanently lubricated deep-groove bearings

Efficiency: Premium EC.

* + - * 1. Total Energy Recovery Wheel <Option, Delete if not required.>:

Type: Total energy recovery wheel with galvanized steel housing.

Rotor Construction: Aluminum structural spoke system with extruded central hub and shaft mounted on pillow block bearings.

Rotor Media: Fluted honeycomb aluminum coated with non-migrating zeolite desiccant composite.

Rotor Drive: Industrial grade adjustable link belt system with AC gear motor for variable speed operation.

Rotor Seals: Pre-adjusted low leakage hybrid brush seals.

Purge Sector: **[None]** **[Required]**.

Bypass Dampers: **[None]** **[Required]**.

* + - * 1. Coils

Supply Air Refrigerant Coil:

Construction: Aluminum-plate fin and seamless copper tube in galvanized steel casing.

Rows: 6.

Fins: 12 fpi.

Coating: [**None**] **[Heresite]** **[Electrofin]** **[HYCOR 2-Coat Corrosion Resistant Hydrophilic Fin-Stock]**.

Condensate Drain Pan: Fabricated using stainless steel sheet, minimum of 2 inches deep, sloped, and complying with ASHRAE 62.1 for design and construction.

Condensate Drain Connection: 1-1/4 inch NPT.

Safety: Condensate pan overflow switches.

Outdoor Air Refrigerant Coils <Air-Cooled Configurations, Delete if not required.>:

Construction: Aluminum-plate fin and seamless copper tube in galvanized steel casing.

Rows: **[insert value]**.

Fins: **[insert value]** fpi.

Coating: [**None**] **[Heresite]** **[Electrofin]** **[HYCOR 2-Coat Corrosion Resistant Hydrophilic Fin-Stock]**.

Water-Cooled Refrigerant Coils <Water-Cooled Configurations, Delete if not required.>:

Construction: High-efficiency coaxial type, **[copper]** **[90/10 cupronickel]** inner tube with steel outer tube shell.

Hot Gas Reheat Refrigerant Coil:

Construction: Aluminum-plate fin and seamless copper tube in galvanized steel casing.

Rows: 2.

Fins: 12 fpi.

Minimum 6 inch gap between hot gas reheat coil and supply air refrigerant coil.

Coating: [**None**] **[Heresite]** **[Electrofin]** **[HYCOR 2-Coat Corrosion Resistant Hydrophilic Fin-Stock]**.

Valve Type: Modulating 3-way.

* + - * 1. REFRIGERANT CIRCUIT COMPONENTS

Refrigerant Circuits: **[One]** **[Two]**.

Compressors: Hermetic, scroll, **[tandem compressors (1 digital, 1 fixed speed)]** **[digital scroll compressor]** mounted on vibration isolators with over-current and thermal protection, and internal pressure relief.

Refrigerant: R-410A.

Specialties (per circuit):

**[Electronic expansion valve]** **[Thermal expansion valve with external equalizer]**.

**[Electronic expansion valve control board, including suction pressure transducer and suction pressure thermistor]**.

Crankcase heaters.

Filter-drier.

Sight glass.

Suction-line accumulator.

Liquid refrigerant receiver.

High refrigerant pressure safety switches, auto reset (600 psig open/475 psig reset).

Low refrigerant pressure safety switches, auto reset (50 psig open/90 psig reset).

**[Four way reversing valve with replaceable magnetic coil].**

* + - * 1. GAS FURNACE <Option, Delete if not required.>

Description: Factory assembled, piped, and wired gas furnace.

Burners: Stainless steel.

Gas Type: **[Natural Gas]** **[Propane]**.

Ignition: Electronically controlled electric spark.

Power Vent: Integral, motorized centrifugal fan interlocked with gas valve.

Valve: Modulating.

Gas Train: Single body, regulated, redundant 24VAC gas valve assembly containing pilot solenoid valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff.

Elevation: **[0-2000 feet]** **[Greater than 2000 feet: <insert value> ft]**.

* + - * 1. ELECTRIC HEAT <Option, Delete if not required.>

Elements: Stainless steel, finned-tube type.

Thermal limit protection: Automatic reset, disk type thermal cut-out.

Control:

Unit mounted circuit breaker.

Type: **[SCR]** **[<Insert Value>-Stages]**.

* + - * 1. AIR FILTRATION

Outdoor Air Intake Hood Panel Filters:

Description: Aluminum, metal mesh, reusable air filters with holding frames.

Supply Air Pre-Filter:

Description: Factory-fabricated, self-supported, pleated, panel-type disposable air filters with holding frame.

Type: 2” MERV-8.

Supply Air Final Filter:

Description: Factory-fabricated, self-supported, pleated, panel-type disposable air filters with holding frame.

Type: 4” MERV-13.

Exhaust Air Filter (Total Energy Recovery Wheel Pre-Filter) <Option, Delete if not required.>:

Description: Aluminum, metal mesh, reusable air filters with holding frames.

* + - * 1. DAMPERS

Outdoor and Return Air Mixing Dampers

Description: **[Parallel]** **[Opposed]** blade galvanized steel dampers with concealed blade-to-blade linkage and permanently lubricated bearings.

Leakage rate: Not to exceed 3 cfm/ft² at 1 in w.g. in accordance with AMCA Standard 500-D.

Damper Actuator: **[Modulating with adjustable minimum position] [2-position with adjustable minimum position]**.

* + - * 1. CONTROLS

Control Sequence: **[Primary Space]** **[Variable Air Volume] [Neutral]** as described in Section as described in MC-Control Section.

Sensors: Included, as described in MC-Control Section.

Controller: **[Factory Standard]** **[Niagara Tridium-Based]**.

* + - * 1. ELECTRICAL POWER CONNECTIONS

Single point power connection. Connection to the unit shall be through a **[factory-]** **[field-]** installed non-fused disconnect accessible from the exterior of the unit.

**[Connection to split condensing unit shall be from the air handling section, through a factory-installed non-fused disconnect accessible from the exterior of the condensing unit.]**

* + - * 1. ACCESSORIES <Options, Delete if not required.>

GFCI Output: Duplex, 115V GFCI outlet **[with 15 amp overcurrent protection served by main power to 115V transformer] [for field wiring to separate 115V service]**.

Dirty Filter Alarm: Filter differential pressure switch with sensor tubing on either side of the filter, set for final filter pressure loss of **<insert value>** inches w.g.

CO2 Sensor: Field installed CO2 sensors for demand controlled ventilation.

**[Outdoor] [and]** **[Supply]** airflow measuring.

Cabinet Lighting: LED service lights and switch installed in **[electrical panel]** **[fan section]** **[coil section]** **[mixing section]** **[and]** **[energy recovery wheel section]**.

Safeties:

Smoke detector.

Firestat.

Phase monitor.

Freezestat.

**[Outdoor]** **[and]** **[Return]** air damper end switch.

**[Supply]** **[and]** **[Exhaust]** fan current sensing relays.

Compressor current sensing relays.

Water-flow proving switch.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine the area and conditions where the unit will be installed for compliance with the installation requirements for the unit before equipment installation.
				2. Verify roughing-in for RTUs is coordinated with actual locations of piping, duct, and electrical connections before equipment installation.
				3. Do not install equipment until unsatisfactory conditions are remedied.
			2. INSTALLATION
				1. Install unit in accordance with manufacturer’s requirements and approved documentation.
				2. Install unit on roof curb and coordinate all roof penetrations and flashing as specified in Division 07. Secure unit to curb rail and curb base to roof framing or concrete base with anchor bolts.
				3. Complete all ductwork, refrigerant piping, control, power wiring, and other service connections in accordance with Division 23 and Division 26.
				4. Verify unit has been leak checked in accordance with manufacturer’s requirements and provided with an appropriate starting charge when breaking vacuum.
				5. Prepare inspection report confirming that the unit is ready for startup.
			3. STARTUP AND FIELD QUALITY CONTROL
				1. Engage a factory-authorized service representative to test and inspect components, assemblies, equipment installation, and final connection.
				2. The factory-authorized service representative shall complete all tests as required by the manufacturer.
				3. Prepare and submit startup report to manufacturer.
			4. CLEANING AND PROTECTION
				1. Protect unit from damage during construction operation. Do not leave access doors open or allow debris to accumulate in the unit. Promptly repair or remove and replace any damaged materials.
				2. After completing system installation and testing, balancing, and adjustments, clean unit and replace filters.
			5. DEMONSTRATION
				1. Engage a factory-authorized representative to train owner’s maintenance personnel to adjust, operating, and maintain the unit.
			6. OCCUPANCY ADJUSTMENT
				1. When requested within 12 months of substantial completion, adjust the system to meet the needs of the occupants to suit the actual operating conditions. Provide up to two visits to project for this purpose.

**END OF SECTION**