

## Guide Specifications

*Aqua-TEC*

### PACKAGED INDOOR POOL DEHUMIDIFICATION UNIT

#### PART 1. GENERAL

##### 1.1 SECTION INCLUDES

- A. Packaged indoor pool dehumidification unit
- B. Factory-matched outside air-cooled condenser

##### 1.2 SUBMITTALS

- A. Product Data: Include rated capacities, latent and sensible cooling capacities, pool water heater performance, motor ampacity, minimum circuit ampacity, unit weight, refrigerant charge, and furnished specialties.
- B. Shop drawings: Include unit dimension sheets detailing opening locations and duct connections, piping locations, control panel location and service clearance; include wiring diagrams clearly outlining differentiation between factory and field connections
- C. Operating Sequence: Provide a written sequence of operation, which details compressor modes of operation and compressor alarm shut downs.
- D. Warranties: Submit warranties as specified in this section.

##### 1.3 QUALITY ASSURANCE

- A. The unit shall be certified by a National Recognized Testing Laboratory (NRTL) as described by the U. S. Occupational Safety and Health Administration (OSHA) and as complying with CSA Standard CAN/CSA-C22.2 No. 236-95 and UL 1995 2<sup>nd</sup> Edition.

##### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products as recommended in Vital Air Bulletin 90, "Installation, Operation and Maintenance".

#### PART 2. PRODUCTS

##### 2.1 ACCEPTABLE MANUFACTURERS

- A. Vital Air, Vital Technologies, Inc.

##### 2.2 GENERAL

- A. Single package closed-loop mechanical refrigeration heat recovery unit, completely piped, wired, and factory tested. The unit shall be built in the U.S.A. and shall consist at a minimum of a compressor, double wall vented coaxial desuperheater, condenser coil, evaporator coil, fan(s), fan motor(s), air filter, outside air opening for room ventilation, and a control system designed to maintain space conditions.

### 2.3 CONSTRUCTION

- A. The cabinet shall be a minimum of 18 gauge for units 0041 through 0121, galvanized and galvanealed steel, painted with an acrylic, polyurethane enamel or powder coating. The base pans shall be formed from 12 or 14 gauge galvanized steel with formed galvanized channels for support and component fastening. Service access to all components shall be provided by access panels on both sides of the wet and dry compartments.
- B. The electrical enclosure shall be formed of a minimum of 16 gauge, galvanized steel and shall be provided with a removable electrical sub-panel. The entire electrical enclosure shall be isolated from the air stream. A manually operated blower and compressor switch shall be accessible from the exterior of the unit on the electrical door. The electrical access door shall be equipped with a closure device requiring a tool for entry.
- C. The condensate drip pan under the evaporator coil shall be formed of 18 ga., T-304 stainless steel, heli-arc welded with the appropriate CSH 40, T-304 stainless coupling attached.
- D. The condenser coil frame shall be constructed of a minimum of 16 ga., galvanized steel and shall provide structural support to the cabinet, as well as directing air flow across the coils.
- E. The entire enclosure and all access panels shall be insulated with 1 1/2 inch thick fiber glass duct liner, approved for 250 degree F operating temperature and tested to withstand air velocities of up to 12,500 fpm. A strong smooth mat shall be laminated to the insulation to insure extra strength. Fire resistance ratings shall conform to NFPA 90A and 90B. Sound absorption coefficient shall not exceed .98 at 4000 Hz as per ASTM E-795 F-25 mounting with sheet metal backing. Thermal conductance shall be 0.45 BTU per sq. ft. per degree F per Hr or less at 50 degrees Fahrenheit. Insulation shall be securely fastened with fire resistive adhesive and mechanical fasteners.
- F. All access panels exposed to the air stream shall be double wall construction with a minimum of 22 ga., galvanized inner liner.
- G. Optional: Units specified to have double wall construction shall have a minimum of 22 ga., galvanized steel inner liner to form an interior cover to all insulation in the cabinet.
- H. All exterior fasteners throughout the unit shall be stainless steel to prevent corrosion and all bolts and nuts are to be plated.
- I. An opening shall be on the suction side of the fan for connection to ventilation ductwork to meet outside air ventilation requirements. The opening shall be positioned between the evaporator and condenser coils.

### 2.4 FAN

- A. The fan shall be a forward curved, double width, double inlet, squirrel-cage, centrifugal type. Each wheel shall be statically and dynamically balanced, tested and installed on a solid steel shaft. The bearings shall be a permanently lubricated ball type or have serviceable grease fittings for long life and high performance.
- B. The fan scroll housing shall be constructed of galvanized steel.
- C. The fan, wheel, shaft, pulley and the bearings shall be sprayed with a vinyl coating to provide protection against the corrosive air stream.
- D. The fan assembly shall be mounted on neoprene vibration isolators to limit blower noise and vibration transmission.

2.5 FAN MOTOR

- A. Fan motor shall be an open, drip proof, induction type, class B insulated and UL/CSA approved. Each motor shall be mounted on an adjustable base to allow setting of the proper belt tension.
- B. Each motor pulley shall be adjustable V-belt type to allow establishment of the proper system CFM. All motor drives 7.5 hp and larger shall have a minimum of two (2) fan belts.
- C. Optional: Units equipped with premium efficiency motors shall be selected with a service factor of 1.15.

2.6 AIR FILTERS

- A. The air filter section shall be a two-inch deep return air box with an access door accessible from the exterior of the unit.
- B. The filter shall have a minimum classification of MERV 6 as outlined by ASHRAE Standard 52.2 to meet ASHRAE Standard 62-2001 filter requirements.
- C. The filter shall be pleated type with an electro-finish wire bonded to a heavy-duty paperboard frame.
- D. The filter shall be listed by U.L. as UL Class 2.

2.7 COMPRESSOR

- A. The compressor shall be a high temperature heavy-duty scroll type for unit series 0041 to 0121.
- B. All compressors shall be suction gas cooled and equipped with thermal overload protectors.
- C. Refrigerant shall be R-22.
- D. All units shall be equipped with a crank-case heater to prevent liquid migration to the compressor during periods of prolonged shut down.
- E. All compressors shall be U.L. approved for high temperature applications.
- F. All compressors shall be equipped with manufacturer adjusted high and low refrigerant pressure controls.
- G. Unit series 0081 and 0121 are equipped with high and low pressure refrigerant gauges.
- H. All compressors shall be mounted on vibration isolators.

2.8 POOL WATER HEATING CIRCUIT

- A. The pool and/or whirlpool water desuperheaters shall be double wall vented coaxial heat exchangers constructed of cupro-nickel metal on the water side for corrosion protection.
- B. The desuperheater shall be sized to optimize heat rejection to the pool. For many pools, the unit will be able to maintain pool water temperatures without use of auxiliary pool water heating.
- C. The desuperheaters shall be securely fastened to the base pan to prevent vibration.
- D. The water piping from the desuperheaters, internal to the unit, shall be type "K" copper for maximum corrosion protection. The desuperheater shall be fitted with an automatic-bleed air vent.
- E. If pool water heating is needed, hot refrigerant will be supplied to the desuperheater through a three-way valve. The hot refrigerant shall continue to the condenser reheat coil to further reclaim refrigerant heat unless a call for cooling is present. The supply

air temperature shall always be equal to or greater than the return air temperature when operating simultaneously in the dehumidification and pool heating modes. If no pool water heating is needed, then hot refrigerant will bypass the desuperheater. The unit shall operate for dehumidification or cooling without water flow from the pool.

2.9 CONDENSER (HOT GAS REHEAT COIL)

- A. Casing and end plates shall be 16 ga., galvanized steel.
- B. Mechanically bonded polyester coated aluminum fins on 1/2 inch O.D. copper tubes. The entire coil assembly, casing, copper tubing and coated fin stock shall be coated with phenolic epoxy for maximum corrosion protection.
- C. Condenser coils shall be a minimum of three (3) rows deep with ten (10) or twelve (12) fins per inch.
- D. The condenser coil shall be sized to transfer the total heat of rejection to the air stream.

2.10 EVAPORATOR (DEHUMIDIFICATION COIL)

- A. Casing and end plates shall be 16 ga., galvanized steel.
- B. Mechanically bonded aluminum fins on 1/2 inch O.D. copper tubes. The entire coil, casing, and tubing shall be coated with phenolic epoxy, triple dipped, and baked for maximum protection against galvanic corrosion and oxidation.
- C. Evaporator coils shall be eight (8) rows deep with seven (7) or eight (8) fins per inch, sized to remove the maximum amount of moisture from the air stream.
- D. The evaporator shall be equipped with a manually operated by-pass damper to adjust the suction temperature.

2.11 SPACE HEATING COIL (OPTIONAL)

- A. Casing and end plates shall be of 16 ga., galvanized steel.
- B. Standard hot water coils shall be 2 rows deep mechanically bonded polyester coated aluminum fins on 1/2 inch O.D. copper tubes. The entire assembly including the casing, coated fin stock, and tubing shall be coated with phenolic epoxy for maximum corrosion protection.
- C. An optional 3-way, modulating spring return hot water valve, sized to handle the rated gpm, shall be factory installed and wired to the microprocessor control panel. The valve shall bypass the coil during power failure.

2.12 REFRIGERATION

- A. All refrigerant piping shall be silver/alloy brazed and evacuated to a minimum of 500 mu vacuum.
- B. All units shall have a thermal expansion valve, liquid line filter, three way valve, liquid moisture indicator visible without removing the access panels, refrigerant access valves for high pressure gas, low pressure gas and liquid line access.
- C. The entire exterior surface of the copper refrigerant piping shall be vinyl coated to prevent corrosion.
- D. Suction piping shall be fully insulated from the evaporator coil to the compressor.
- E. Unit series 0081 and 0121 shall include high and low pressure refrigerant gauges visible from the exterior of the cabinet.
- F. Refrigeration access valves shall be located on the exterior of the cabinet for ease of servicing.

2.13 ELECTRICAL

- A. The blower motor controls shall be equipped with an adjustable manual reset overload relay for motor protection. The compressors shall be equipped with a thermal overload protection device.
- B. The compressor and blower shall each be either equipped with IEC Class 2 motor protection or Class CC or J rated fuses for over current protection rated at 125% of RLA.
- C. Terminals or tie in points shall be provided within the electrical enclosure for low voltage connection to the space temperature and humidity sensor, auxiliary heating unit, auxiliary remote air cooled condenser, external exhaust fan, and a combination smoke / fire detector.
- D. Pilot duty terminal connections shall be available rated for 24 volt, 24 VA, for field supply and installation of an isolation relay to control a external exhaust fan, ventilation damper, if not factory installed, 2 stages of space heating, and room heating circulator.
- E. All wiring shall be done in compliance with NEMA standards.

2.14 CONTROL PANEL

- A. The control panel shall be located on the service access side of the equipment.
- B. The control panel enclosure shall be formed of a minimum of 16 gauge, galvanized steel and shall be provided with a removable electrical sub-panel. The entire electrical enclosure shall be isolated from the air stream. The electrical access door shall be equipped with a locking device requiring a tool for entry.
- C. The compressor circuit shall have an anti-cycle timer to prevent compressor short cycling included in the microprocessor control system.
- D. Status lights shall indicate mode of unit operation for space heating, space cooling and dehumidification. Status lights shall also indicate operation of the blower motor and compressor.
- E. Alarm status shall indicate the following: Blower Overload, Refrigerant Circuit High Pressure Trip, Water Flow Interruption

2.15 OPTIONAL OUTSIDE AIR VENTILATION DAMPER

- A. For units equipped with an optional outside air damper, the damper shall be located between the evaporator and condenser reheat coil. The damper shall be sized to handle the specified amount of ventilation air. This damper shall be constructed of aluminum blades with nylon bearings and be of the low leakage construction.
- B. For units equipped with an optional motorized damper, the motor shall be field adjustable through a manual potentiometer allowing the damper to be field balanced to the specified outside air CFM. In the case of power failure, the outside air damper shall move to the close position.

2.16 OPTIONAL REMOTE AIR-COOLED CONDENSER

- A. Units equipped with the remote air-cooled condenser shall be sized to handle 100% of the heat of rejection.
- B. The remote air-cooled condenser shall be modular in design and arranged for vertical air discharge.
- C. The remote air-cooled condenser fan motors shall be weather resistant with sealed ball bearings; inherent overheat protection in each phase; shaft slingers; enclosure, hardware and insulation for all weather conditions.

- D. The coil shall be constructed of copper tubes that are mechanically expanded into corrugated full collared aluminum plate fins spaced 10 or 12 per inch. The tube sheets are aluminum with tube collars preventing tube wear due to uneven thermal expansion.
- E. Coils are to be pressure tested under water with 400 psig air, evacuated to 500 microns, and shipped pressurized with dry nitrogen.

**2.17 OPTIONAL WATER-COOLED CONDENSER**

- A. Units equipped with a water-cooled condenser shall be sized to handle 100% of the heat of rejection and be of the Brazed Plate heat exchanger construction.

**2.18 TESTING**

- A. The unit shall be certified by Canadian Standards Association (CSA) (CSA Standard C22.2 NO. 236-95) and be tested per UL Standard #1995
- B. Each unit shall be factory tested prior to shipment. Component checks will be performed on the air flow system, water flow system, refrigeration circuit, and electrical system.
- C. Units shall be operated and leak tested to ensure the integrity of piping and related connections.

**2.19 WARRANTY PERIOD**

- A. All components shall be warranted, as outlined in the unit warranty, for a period of one year from date of equipment start-up or one year and ninety days from shipment, whichever is sooner.
- B. Optional: The compressor shall be warranted for a period of 5 years from the date of start-up or five years and ninety days from shipment, whichever is sooner.

**2.20 UNIT MANUFACTURER**

- A. The unit shall be manufactured by VITAL AIR, VITAL TECHNOLOGIES, INC, Auburn, Maine, U.S.A.

**PART 3. EXECUTION**

**3.1 INSTALLATION**

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representatives direct otherwise.
- B. Install unit where shown on drawings. Provide clearance around sides and around compressor compartment of unit for proper air flow and adequate service access.
- C. Provide and install all water piping, drains and controls for proper operation of the unit.

### 3.2 START-UP

- A. A qualified air balance company shall provide an air balance on the unit prior to start-up. If the adjustable sheaves provided on the equipment cannot provide for the unit's data plate air volume, then the installing contractor shall provide the recommended replacement sheaves to be mounted and balanced by the air balance company.
- B. Start-up services shall be provided by the equipment manufacturer's authorized representative and shall include a complete testing of all controls and unit operation. The agency responsible for start-up shall record the refrigeration pressures, temperatures and electrical operating data on the factory supplied start-up form. Copies of this data are to be supplied to the factory for review.
- C. All units shall be thoroughly cleaned by the installing contractor in accordance with the manufacturer's instructions prior to being placed into service.
- D. A complete set of operating and maintenance manuals, including wiring diagrams, start-up instruction, operating sequence and material list shall be provided to the owner.
- E. Optional: Representatives of the owner shall receive at least four hours of instruction on the operation and maintenance of the unit.