HVAC SPECIFICATIONS

A. It is the intent of these specifications to define the work and materials typically installed by a Mechanical Contractor. However, it is not intended to define a subcontract between the Mechanical Contractor and the General Contractor. The General Contractor is responsible for the entire project and any questions regarding scope of work shall be directed to the General Contractor.

B. Work shall include all labor, materials, fixtures, equipment, tools and service necessary for installation, testing and adjusting of all mechanical systems shall be furnished and installed in compliance with the Drawings, Specifications, and any Addenda thereto.

C. Drawings and Specifications shall be understood to cover, according to their intent and meaning, complete mechanical systems. Work shown and not specified, or work specified and not shown shall be performed as though mentioned in both.

D. Minor items and accessories reasonably inferred as necessary for the complete and proper operation of any system shall be provided by contractor or subcontractor for such system whether or not they are specifically called for.

E. Before submitting a bid, the Mechanical Contractor is to coordinate with the General Contractor to ascertain, in detail, the division of work, and the extent of performance other subs and the General Contractor.

F. All work shall be performed or installed in strict accordance with Florida Building Code 2007 Mechanical with 2008 and 2009 Amendments Codes and all applicable rules, regulations and codes of local state and Federal Governments having lawful jurisdiction, and each contractor and subcontractor shall be responsible for such compliance.

G. Fees for permits, inspections, patent use, royalties, etc. shall be paid by the contractor.

H. All systems shall be tested for proper operation, rotation air supply, water supply, pressures, flows, balance, vibration, and appropriate interlocks as required by these specifications or manufacturers' recommendations.

I. All work shall be installed in accordance with the appropriate codes and satisfy the local inspector having jurisdiction.

J. Upon completion of each part of the mechanical system, the contractor shall demonstrate to the Engineer that each item on that system is installed with proper covers, safeties, controls, etc., and that all are in proper working order.

K. A set of "red-lined" mechanical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routings of piping, ducts, grilles, equipment, valves, and any equipment specified on the drawings or in these specifications.

L. Equipment and materials shall be new and meet or exceed specification requirements.
1. All products shall be current model for which replacement parts are available.

M. Acceptable manufacturers are listed, additional manufacturers may request approval for their products up to 10 days in advance of bid. Engineer may require supplemental information prior to accepting or rejecting the alternate.

N. All work shall be performed in compliance with OSHA regulations.

O. Shop drawings and product data shall be submitted on all equipment, fixtures, etc
1. Sumittals shall include all equipment to be installed by the subcontractor and all submittals must be made at same time.
2. Each package must have the General Contractors review stamp prior to submittal.
3. The Engineer will review one submittal and one resubmittal; subsequent resubmittals may require a review charge to be paid by subcontractor.
4. Shop drawings shall be labeled in the same designation as the drawings

P. Job conditions shall be determined prior to bidding in the following manner:
1. Site visit to determine:
   a. Existing conditions.
   b. How and where materials will be delivered and stored.
   c. Special problems encountered during construction.
2. Examine all Contract Drawings and Specifications to determine:
   a. Type of construction to be used.
   b. How construction or work will effect the work of this Section.
   c. Nature and extent of work of other trades.

Q. Failure to determine existing conditions or nature of construction will not be considered as a basis for granting additional compensation.

R. Installation:
1. Contract Drawings show the arrangements and sizes of principal apparatus and devices to be provided under this Contract and connection thereto. These shall be followed as closely as actual building construction will permit.
2. Dimensions of work as indicated on Plans are not guaranteed to be as-built d dimensions.
3. No measurements shall be scaled from Drawings and used as definite dimensions for layout or fitting work in place.
4. Layout of equipment, as shown on the plans, shall be checked and exact location determined by dimension if equipment approved by the Architect.
5. Consult the Drawings for all dimensions, locations of partitions, sizes of structural member, foundations, etc.
6. Do not make final layouts until shop or equipment drawings are approved and job conditions verified.
7. Mechanical reference symbols are given on the mechanical legend on the drawings.

S. Rough-in:
1. Work included:
   a. Contractor shall rough-in for all equipment, fixtures, etc., in building whether or not such equipment is furnished by this Contractor or by Owner.
2. Method:
   a. Determine in advance the location and size of all openings and chases necessary for proper installation of all work and have openings and chases provided during construction.
   b. Install all inserts for hangers and supports of mechanical work and equipment work as general construction progresses.
   c. Rough-in openings in masonry or stud walls shall be cut, not broken or chiseled.
   d. Sleeves shall be required at all points where piping passes through concrete walls, slabs or masonry walls; sleeves installed below grade or where subject to high water conditions shall be installed watertight.

T. Coordination:
1. Work shall be coordinated between all Contractors, Subcontractors, Installers, Suppliers, Trades, etc., to:
   a. Insure a neatly fitted installation.
   b. Determine the nature and extent of the work of others.
   c. Eliminate interferences.
   d. Maintain maximum headroom and clearances.
2. Any interference which develops or is foreseen and cannot be resolved by the affected trades, etc. shall be handled as follows:
   a. Cease installation of that portion of the work which is in conflict as no additional compensation will be allowed for any relocation, etc.
   b. Continue work only on other portions of the work which are not in conflict.
   c. Notify the Architect immediately.
   d. Architect's decision shall be final as to any relocation, rerouting, removal, etc.
   e. No additional compensation will be allowed for removal, relocation, repairs or changes required by interferences.

U. Clear away all debris, surplus materials, etc., resulting from work on operations, leaving job and equipment in clean first-class condition.

V. Clean all rotating equipment, ducts, piping, etc., and leave them in a ready-to-use condition.

W. Where factory finish is provided on equipment, all marred or damaged surfaces shall be touched-up or refinished hereunder as approved.

X. Thoroughly clean all items of equipment, leaving them in first-class condition.

Y. Wipe clean or wash if necessary air surfaces of all coils, fan housings, fan wheels, fan motors, air unit plenums, and all air filters.

Z. All pumps, motors, fans and other rotating equipment shall be stored at Site with openings, bearing, etc., covered to exclude dust and moisture; all stockpiled conduit shall be placed on dunnage, and protected from weather, from entry of foreign materials.

BALANCING OF AIR SYSTEMS

A. Balance and adjust each air distribution system shown on the Drawings.

B. Perform work in accordance with procedures and standards described in SMACNA Balancing and Adjustment Manual."

C. Balancing shall be done by a certified balancing firm independent of the Mechanical Contractor.

D. Reports shall be made on SMACNA forms.

E. Submit five (5) copies for approval and record.

F. Examine HVAC units to see that they are free from obstructions.

G. Open all dampers and grilles.

H. Check lubrication of all moving equipment.

I. Check for proper installation of filters.

J. Perform other inspection and maintenance activities necessary for proper operation of systems.

K. Fuse sizes and thermal overload heaters shall be checked against each motor nameplate.

L. The amperage shall be read at each electrical motor to determine the load imposed on it.

M. Adjustment and Balance:
1. Adjust variable type pulleys, volume dampers, control dampers, etc. to provide correct volumes to main trunk lines.
2. Check and adjust outside air quantities as required.
3. Adjust air extractors and manual balancing dampers to supply correct air volume to each main branch duct from main trunk lines.
4. Adjust manual balancing dampers to supply correct volume to each individual branch duct.
5. Use terminal registers only for minimal adjustment of air flows, i.e. less than 5 % of air volume.
6. Adjust grilles and diffusers for proper air flow patterns.
7. Air conditioning units shall be placed in operation and both wet and dry bulb temperature taken at one-hour intervals to determine the amount of cooling being accomplished and to indicate adjustments needed.
8. After spaces have been brought down to design temperatures and equipment is funcfioning properly, air shall be rebalanced if necessary by means of calibrated thermometers placed in each room and in open spaces,not over 20' apart. There shall be no deviation in temperature of more than 3 F. throughout the space cooled.
9. A thorough check shall be made, with an anemometer, of air motion in the occupied space. Any air motion exceeding 50 fpm shall be remedied.

COPPER PIPE

A. Refrigerant
1. ACR Copper
2. All refrigerant pipe and fittings having an external or internal working pressure greater than 15 psig shall comply with ANSI Code for Pressure Piping where applicable.
3. Joints
   a. Solder using Silver solder or "Sil-Fos."
   b. Compression fittings may be used at equipment connections.
4. Fittings
   a. Wrought copper
   b. Approved compression type brass.

PLASTIC PIPE AND FITTINGS

A. Air Conditioning condensate drains
1. PVC – ASTM D-1784-60T
   a. Schedule 40.
   b. Type 1, Grade 1.
2. Joints
   a. Bonded joints using adhesive per manufacturer's recommendations
3. Fittings
   a. PVC – ASTM D-2665-69

UNITARY HEATING AND COOLING EQUIPMENT

A. This system applies to Split System or Packaged heating and cooling units with reverse cycle and heat strip where specified.
1. Refer to Equipment Schedules on drawings for Model, Size, Capacity and additional required accessories.

B. Acceptable Manufacturers
1. Trane
2. Carrier
3. Lennox

C. Evaporator
1. Airflow as indicated on drawings.
2. Fan shall be direct – drive, forward-curved, double inlet, statically and dynamically balanced.
3. Fan motor shall be resiliently mounted and shall be easily removable for service.
4. Fan motor shall be permanent –split-capacitor type with integal overload protection, high – efficency, Florida Energy Code Minimum.
5. Cooling coil shall have aluminum fins mechanically bonded to copper tubing. Coil shall have factory installed refrigerant metering devices.

D. Condensing Section
1. Condensing Unit shall be designed for use with Refrigerant R410a and contain sufficient charges (R410a) for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior of unit.
2. Oxtdoor coil shall be constructed with aluminum fins mechanically bonded to non-ferrous tubing. Factory installed coil refrigerant metering device shall be mounted on unit: liquid service valve. Metering device internal components shall be removable for cleaning or replacement.
3. Condenser fan shall be propeller type, direct driven, and arranged for vertical air dischage. Fan motor shall be factory lubricated, inherently protected and resiliently mounted.
4. Compressor shall be of the welded-hermetic type with internal vibration isolation and shall be covered with a shield to muffle operating sound. Compressor motor shall have boh thermal and current –sensitive overload device. Compressor shall be equipped

with a crank-case heater and have internal high-pressure protection.

5. Controls shall be factory wired and located in a readily accessible location. Controls and protective devices shall include a liquid line low pressure switch, suction line accumulator and pressure relief device. Control wiring termind board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point-to-point connection.
6. Unit shall be equipped with a reversing valve and defrost controls when specified as a Heat Pump.

E. Resistance Heater:
1. Heaters shall be wired for the number of stages of operation indicated on the Drawings.
2. Heaters shall be equippd with thermal and current overload devices as required by equipment listings and applicable codes.

F. Refer to Mechanical Equipment Schedule for Model Numbers.

EXHAUST FANS

A. All exhaust fans mounted in the ceiling inside the building and ducted to the outside.

B. Meet the specification for air delivery at static pressre as specified on the Equipment Schedule.

C. Meet the noise criteria (if specified on Schedule).

D. Be of the manufacture and model number specified in the Equipment Schedule or equal.

E. Shall be UL listed.

F. Acceptable Manufacturers
1. Penn ventilator
2. Briedert
3. Greenheck

G. General
1. Acoustically insulated steel housing
2. Baked enamel finish on housing
3. Adjustable mounting brackets
4. Automatic backdraft damper at the discharge duct
5. Lifetime lubricated motor
6. Terminal box on housing with cord, plug and receptacle inside the housing.
7. Fan motor and wheel shall be removable without removing entire fan housing.

POWER ROOF VENTILATORS – NOT USED

A. All powered roof-mounted exhaust fans which are connected to spaces within the building by ductwork.

B. General
1. Ventilators shall meet the Specifications listed on the Mechanical Equipment Schedule.
2. Ventilators shall be installed where shown on the drawings and properly flashed according to details on the drawings.

C. Acceptable Manufacturers
1. Penn Ventilator
2. Greenheck
3. Bledert
4. Aprowed Equal

D. General:
1. Heavy gauge spum aluminum
2. Mitor cover easily removable
3. Bilance propellor
4. Pavide hole inside the unit for electrical connection
5. Open frame, sealed bearing motor-vertical mounting
6. Pirmanent split capacitor or split phase motor-single speed with thermal overload protection.
7. Sladed pole motor-variable speed
8. Gavity backdraft dampers
9. Bidscreen
10. Disconnect built into unit
11. Extruded curb
12. Direct drive or belt drive as required for capacity indicated or as shown on Schedule.

E. Model Number Refer to "Exhaust Fan Schedule."

INLINE FANS – NOT USED

A. All duct mounted supply or exhaust fans

B. Meet the specification for air delivery at static pressure as specified on the Equipment Schedule.

C. Meet the noise criteria (if specified on Schedule).

D. Be of the manufacture and model number specified in the Equipment Schedule or equal.

E. Shall be UL listed.

F. Acceptable Manufacturers
1. Penn ventilator
2. Bledert
3. Greenheck

G. General
1. Acoustically insulated steel housing
2. Baked enamel finish on housing
3. Adjustable mounting brackets
4. Automatic backdraft damper at the discharge duct
5. Lifetime lubricated motor
6. Terminal box on housing with cord, plug and receptacle inside the housing.
7. Fan motor and wheel shall be removable without removing entire fan housing.

DUCTWORK

A. All Supply Ductwork shall be low pressure sheetmetal ductwork.
1. External insulation shall be installed on all duct, 2" fiberglass duct wrap.
   a. Minimum insulation – R6

B. All general exhaust ductwork shall be low pressure sheet metal.
1. Insulation not required

C. RAW Outdoor air ductwork in shall be low-pressure metal.
1. Insulation not required

D. Precondition Ventilation air shall be low pressure sheetmetal
1. External insulation with 2" fiberglass duct wrap.
   a. Minimum insulation – R6

E. LOW – PRESSURE SHEETMETAL DUCTWORK
1. Except as otherwise specified or detailed on the Drawings, all ductwork shall be constructed in accordance with the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
2. Duct systems shall be complete, including all duct fittings, turning vaness, transverse reinforcing hangers, supports, etc., as detailed on the Drawings or in the standards.
3. Provide and install balancing dampers or adjustable splitters at all branch ducts, and where required for balancing the system.
4. Each damper shall be adjustable with an approved quadrant or regulator. Dampers to be opposed blade type for ducts over 12" in any dimension, for ducts 12" single blade is acceptable except for outdoor air intakes which shall be low-leakage opposed blade.
5. Dimensions shown are net inside dimensions (including insulation).
6. Galvanized sheetmetal duct shall conform to the following thicknesses

Largest dimension	Gauge
0–30 inches	24
30–54 inches	22
55–84 inches	20
over 84 inches	18

F. Flexible Duct where shown shall not exceed 6'–0" in length.
1. Duct shall be spiral wire core with minimum R6 insulation rating. Internal vapor barrier and external foil jacket meeting UL–181.
2. Provide branch takeoff taps with locking quadrant dampers for each flexible duct branch takeoff.

G. Plenums shall be constructed and tested in accordance with SMACNA STANDARDS.

H. FLEXIBLE CONNECIONS
1. Provide between duct system and air moving equipment
2. Connection shall be made with not less than 4" wide flexible collar using "Ventglas" 30-ounce neoprene cooted glass fabric.

I. Where construction methods for various items are not indicated on the Drawings or specified herein, all such work shall be fabricated and installed in strict accordance with the recommended methods, metal gauges, hanging procedures, access door and accessory installation, etc., as outlined, the latest edition of SMACNA'S Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning System.

J. Install all ductwork generally as shown on the drawings and as required by SMACNA Manual.

K. Sheetmetal
1. Low pressure ductwork and fittings shall be made tight for minimum air leakage.
2. Provide fiberglass tape and mastic to all joints.
   a. Pressure tape shall not be used to seal joints.
3. All ductwork, except in equipment rooms shall be concealed in construction spaces above ceilings, in partitions, chases, etc.
4. Ducts shall be constructed to provide specified air through building without odding noises to the air stream by sudden contractions as sharp edges.
5. Ducts shall be securly fastened to the structure with hangers.
6. Connections:
   a. Ducts shall be air tight braced and reinforced to prevent vibration and breathing
   b. Seal supply, return, exhaust and outside air ductwork with adhesive sealing compound
   c. Exterior ductwork to be housed with metal cover, galvanized or aluminum, or weather proofed using felt and AB 20 and asphalt mastic (bull).
   d. Rectangular duct connections shall be made with pocket slip or Bar-s slip not more than 8 ft. apart up to 24 in. largest dimension and not more than 4 ft. apart above 24 in. largest dimension

L. Leakage:
1. Contractor shall make necessary repair and shall make duct system ready for a leakage test.
2. Test shall be performed by Test and Balance Contractor.
3. Leakage shall not exceed 1 % leakage for high pressure duct and 5 % for low pressure duct construction.

DUCT INSULATION

A. Acceptable Manufacturers
1. Johns-Manville
2. Certainteed
3. Knauf

B. Duct Wrap:
1. 2" inch thick fiberglass
2. Flamespread 25 per ASTM E–84
3. Smoke developed 50 per ASTM E–84
4. Factory applied vapor barrier – heavy duty 4 mil vinyl film, class 1, meeting NFPA 90A and 90B, UL rated
5. Product:
   a. Johns–Manville "Micralite"

C. Accessories:
1. Insulation tape, mastic, adhesives, etc., shall have the same flamespread and smoke rating as the insulation to which they are applied and meet manufacturer's recommendations.

D. Ductwrap
1. Overlap seams of ductwrap, secure with 4" wide open weave glass fabric and two coats of vapor retarder mastic.
2. Underside of ductwork greater than 24" wide shall also be secured with mechanical fasteners with tape.
3. Pressure tape is not acceptable.

DUCT HANGERS AND SUPPORTS

A. All ductwork for air supply, return, fresh air or exhaust shall be supported by duct hangers, clamps, clips or supports.

B. Acceptable Manufactureres
Duct hangers may be a manufactured item or field fabricated as required.

C. Galvanized steel straps
1. Minimum 16 gauge and 1 1/4 inch wide

D. Trapeze hangers
1. Ducts 20 inches to 40 inches largest dimension.
   a. Minimum 1 inch x 1 inch x 1/4 inch steel angles.
   b. Minimum 1/4 inch threaded rod
2. Ducts above 40 inches largest dimension and plenums
   a. Minimum 1–1/2 inch x 1–1/2 inch x 1/4 inch steel angles.
   b. Minimum 3/8 inch threaded rod.

E. Supports
1. All ductwork shall be supported from structural building members, i.e. block, beams,columns, purlins, joists, etc.
2. Ductwork shall not be supported from ceiling tile or grids, conduit, mechanical equipment, piping or non–structural steel.
3. Ductwork hangers shall be attached to building steel by bolts, screws, clamps or welding.

F. Flexible Cloth Duct Hanger Straps may be used in concealed areas.
1. Straps shall be minimum of 1 1/4 inch wide.
2. Provide aluminum saddles under any duct whose insulation is being crushed.
3. Straps must attach to structure directly.

F. Hanger Bands
1. Horizontal concealed ductwork up to 20 inches largest dimension shall be supported by one (1) inch x 16 gauge galvanized steel straps at a maximum spacing of 10 ft. and at each elbow or branch takeoff.
2. Bands and spacing shall be at a maximum spacing of 10 feet on horizontal runs and at each elbow or branch takeoff.
   a. No nails shall be driven through any ductwork and into floor joists, trusses, etc.
3. Vertical ductwork, all sizes, shall be supported by bands bolted or screwed to walls, studs, etc.
4. Hanger bands shall be bent over one (1) inch from end and turned under corners of rectangular duct.
5. Duct hanger bands shall be fastened with sheet metal screws at six (6) inch intervals up sides and into bottom.
   a. Sheet metal screws shall be 3/4 inch so as not to penetrate duct liner completely.

G. Trapeze Hangers
1. Horizontal ductwork larger than 20 inches largest dimension and all exposed ductwork shall be supported by trapeze type hangers.
2. Trapeze hangers shall be at a maximum spacing of 10 feet and at each elbow or branch takeoff.
3. Hanger rods shall be secured to bottom bracing angles with nuts and locknuts.

DUCT ACCESSORIES

A. Air distribution system shall be furnished complete with duct accessories necessary to allow complete air balancing and adjusting of flow and volume.

B. All square duct corners and "T" connections shall be fitted with turning vanes.

C. All branch duct takeoffs shall be fitted with nonadjustable air turning vanes AND manual volume control dampers, OR adjustable volume extractors which are adjustable from outside the duct.

D. Each grille and diffuser shall be fitted with a manual volume control register at the face of the grille and adjustable from the face of the grille without requiring removal of the grille.

E. Acceptable Manufacturers
1. Barber Colman
2. Titus
3. Properly submitted approved equal

F. Air turning vanes:
1. Multiple radius vanes
2. Steel construction
3. Electrocoated white finish
4. Maximum pressure loss = 20 % of velocity head
5. Model number – equal to Barber Colman Models AODA and AOOF

G. Volume Extractors:
1. Gang operated parallel blade
2. Fully adjustable from wide open to full closed
3. Supply with supporting foot as required for branch takeoffs not in the same plane as trunk lines.

VOLUME DAMPERS

A. All return air and fresh air dampers shall be parallel blade pivot dampers with motorized control where noted.

B. All balancing dampers shall have manual control dampers with positive position locking.

C. Acceptable Manufacturers
1. Prefco Manufacturing Co.
2. Titus
3. Ruskin

D. Parallel Blade Pivot Dampers:
1. Low leakage non–degradable
2. Friction free metal to metal seals incorporated into the blade and frame shapes
3. Galvanized steel frame, 16 gauge
4. Galvanized steel blades, 22 gauge with double–wrapped center and edge forming
5. Maximum leakage – 11 CFM per sq. ft. @ 1 inch S.P.
6. The static pressure loss shall not exceed 0.7" W.C. @ 2000 FPM and 50 % modulation
7. Model Number
   a. Equal to Prefco Model 5150

FIRE DAMPERS

A. Provide fire dampers at all locations shown or noted on the drawings.
1. Fire dampers shall have only thermally actuated fusible links.

B. Acceptable Manufacturerers
1. Prefco Manufacturing Co.
2. Ruskin
3. Titus

C. Dampers – mounted vertically
1. Damper construction shall meet the requirements of NFPA 90A.
2. Type B, low profile, low pressure loss.
3. Blade stack shall only enter the air stream to 4 % of the damper height.
4. Damper requires no extra height for duct installation, i.e., there shall be no "top cap."
5. Blades shall be 4–1/2 inch depth – roll formed .21 gauge galvanized steel.
6. Frame, E–shaped, one piece roll–formed .21 gauge galvanized steel.
7. Blades rotate, travel and seal on a single central frame track.
8. Classified 1–1/2 hour rating, UL Listed.
9. Fire dampers shall have thermal link.
10. Model:
   a. Dampers shall be equal to a Prefco "Low Profile B" or approved equal.

D. Dampers – mounted horizontally in ceiling:
1. UL Listed ceiling damper
2. Round or square as required
3. 2 hour rated
4. Single or dual blade depending on duct size
5. Model Number
   a. Prefco Model 5650, 5600, or 5660

E Link:
1. Fusible link rated at 165 Degrees F. release temperature.

DUCT ACCESS PANELS AND TEST HOLES

A. Provide an access panel at each return air and/or fresh air damper which will allow for inspection and cleaning of dampers.
1. Where return and fresh air dampers are located adjacent, one access door is sufficient, providing each damper is accessible.

B. Provide an access panel at each fire damper for resetting and maintenance of each fire and smoke damper.

C. Provide test holes for measurement of air flow, on each branch duct and main trunk line or plenum.

D. Acceptable Manufacturers
1. Penn Ventilator Co.
2. Ruskin

E. Access Doors:
1. Insulated hinged duct access door
2. Standard gauge galvanized steel
3. Continuous piano hinge
4. Gasketed at door frame surface and at frame to duct surface
5. Positive acting cam latch handle
6. Doors shall be of sufficient size to allow access to both sides of dampers
7. If duct width is greater than 36 inches, provide access doors on each side of duct for access to entire dampers.
8. Exception:
   a. Where access door must be installed in such a position that hinged opening is not possible, provide door that is completely removable.
   b. Removable door shall have cam–locks on both sides
9. Model Numbers:
   a. Hinged doors shall be equal to Penn Ventilator Model DAD
   b. Non–hinged removable door shall be equal to Penn Ventilator Model DAD–RP.

F. Test Holes
1. Provide a capped access hole in each trunk line or branch duct for insertion of air–flow pitot for flow measurement.

WALL DIFFUSERS

A. Acceptable Manufacturers
1. Titus
2. Anemostat
3. Metalaire

B. Materials
1. Aluminum air foil
2. Aluminum frame
3. Integral opposed blade damper, screwdriver operated from face
4. Sponge rubber gasket
5. Neck size and shape as noted on drawings.
6. Contractor shall verify ceiling type with Architectural drawings and General Contractor prior to order.

C. Install as closely as possible to the locations shown on the Drawings.

D. Clean dirt, grease, fingerprints, etc. from grilles after installation.

E. Scratched, dented, bent, or marred diffusers shall be repaired or replaced at the option of the Architect.

WALL LOUVERS

A. Wall louvers shall be heavy–gauge extruded–aluminum type with multiple breaks or ridges to prevent water from traveling up the blade. Blade depth shall be 4 in., unless shown otherwise on the drawings.

B. Blade shall slope at approximately 45 deg. and shall be reinforced on the outer and inner edges with a reinforced lip.

C. Louvers shall bear the AMCA Seal as having been rated in accordance with Standard 500 for air performance and moisture penetration.

D. Finish shall be factory–anodized aluminum color, unless specified otherwise. If specific color is required, a sample of the required color will be furnished.

E. Louver shall be designed for flange mounting against the face of the building.

F. Louvers shall be provided with an aluminum bird screen in a removable frame on the inside. Insect screen, if shown on the drawings for intake louvers, shall be aluminum in an aluminum frame and shall be mounted on the exterior of the louver.

G. For larger–size louvers, provide mullions to provide rigidity and allow expansion.

H. Install the louver in the masonry opening with the flange extensing around the perimeter of the louver and 1/4 in., away from the wall to allow caulking. Secure the louver in such a way to prevent entry into the building.

I. Caulk the perimeter of the louver at the junction of the wall with silicone caulk, applied as recommended by the manufacturer. Allow room for expansion and contraction without damage to the caulking.

DISPOSABLE FILTERS

A. Provide 1" pleated for units 5 tons and below.

B. Provide 2" pleated for units greater than 5 tons.

C. All filters shall be MERV 7 rated.

CONTROL SYSTEM

PART 1 – GENERAL

DESCRIPTION

A. GENERAL
1. Furnish and install all electrical controls and components for all mechanical systems as listed below.

B. SPLIT SYSTEM HEAT PUMPS HP–1, HP–2, HP–3
1. Provide Heat – Cool – Off. Fan–On–Auto, thermostat, electronic, fully programmable with 4 functions per day, seven day/week programmable. Thermostat shall have two stage cooling and three stage heating.

C. HP–4
1. Provide Heat – Cool – Off. Fan–On–Auto, thermostat, electronic, fully programmable with 4 functons per day, seven day/week programmable. Thermostat shall have two stage cooling and two stage heating.

PART 3 – SEQUENCE OF OPERATION

A. HP–1, 2, 3
1. Occupied Mode–
   a. Provide four (4) motion sensors that shall work thru the relay aux input to index the unit to occupied mode. This input shall work independently of the time clock function in the thermostat. Either t'stat time clock or motion sensors shall index unit to occupied mode.
   b. Air Handler #1 shall run continuously and O.A. Damper shall open to minimum position of 400 CFM.
   c. Dual Compressor Heat Pump shall be controlled by stage 1 cooling on thermostat and compressor start/stop shall be based on call for cooling with with internal modulation of compressors by pressure.
   d. A CO2 Sensor shall drive the motorized O.A. Damper to 1000 CFM if CO2 exceeds set point and damper shall remain open until sensor is satisfied.
   e. AH–1 , HP–1 shall operate in similar fashion in heating mode except that Stage 3 heating shall energize the electric heat strip.
   f. Additionally the emergency heat control shall energize the heat strip.
   g. Stage 2 Cooling on the thermostat shall start both air handlers 2 and 3 and their respective compressors.
   h. When Air handlers 2 and 3 start, their respective outside air dampers shall open to 150 CFM. If CO2 sensor is not satisfied, then each damper shall open to 400 CFM until CO2 sensor is satisfied.

B. HP–4 / AHU–4, HP–5 / AHU–5
1. Air Handler / Heat Pump shall cycle both fan and compressors to maintain heating cooling set point based on programmable thermostat.
2. CO2 Sensor shall open motorize O.A. Damper to 150 CFM only if CO2 exceeds set point.
3. Additionally the emergency heat control shall energize the heat strip.

FIRE STATS

A. Provide fire stats on each unit as required by code.
1. Firestat shall shut down all unit components including fans, compressors, .

DUCT SMOKE DETECTOR

A. Contractor shall install duct smoke detectors to shut down AH–1, AH–2, AH–3.

Coburn and Associates, Inc.
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FLORIDA LICENSED ENGINEERS: #38320368
RICHARD E. COBURN, PE #32820

CA JOB NO. 1009

STATE OF FLORIDA PROFESSIONAL ENGINEER

P.E. # 56001

WEST SIDE COMMUNITY CENTER

CERTIFICATE OF AUTHORIZATION # 00008701

Freeman Design Group Inc
128 SW NASSAU STREET
LAKE CITY, FL. 32025
(386)758-4209

DATE	DRAWN BY
11/9/10	MES
	APPROVED
	REC

REVISIONS

SHEET M4 OF

PROJECT NO. 09.C037