

MECHANICAL DESIGN NARRATIVE

SECTION - MECHANICAL

I. MECHANICAL SYSTEM

A. Design Criteria:

1. ASHRAE Weather Data and Design Conditions:

Summer

Winter

a. Outdoor Air: 94°Fdb/75° Fwb -10° Fdb

2. Recommended Space Design Temperatures:

Summer

Winter

- a. Retail: 72° Fdb 70° Fdb
- b. Storage: 72° Fdb 70° Fdb
- c. Open Seating/Bar: 72° Fdb 70° Fdb
- d. Lavatories: 72° Fdb 70° Fdb
- e. The building shall operate on an occupied/unoccupied cycle as determined by the Lighting Control & Design (LC&D) system. During unoccupied hours the building shall go into night setback mode. At night setback/shutdown the RTU outdoor air intake damper shall close. The building may drift to setback temperatures of 85°F summer (adj.) and 55°F winter (adj.). If the temperatures rise above or drift below the unoccupied setpoints, the RTU supply fan(s) shall cycle in conjunction with either the heating or cooling system until the space is satisfied

3. Minimum Outside Air Requirements:

- a. The minimum ventilation requirements will be provided with mechanical ventilation subject to compliance with the International Building Code or ASHRAE Standard 62.1-2010: Ventilation for Acceptable Indoor Air Quality or local codes, whichever is more stringent.

4. Minimum Ventilation Requirements:

CFM

- a. Public Restrooms (exhaust intermittent): 75 cfm/fixture
- b. Break Rooms: 2 cfm/sq. ft.

5. Load Densities for Cooling System Design:

Value

- a. Retail: 1.22 watts/sf lighting
- b. Retail Areas Power: 3.0 watts/sf power



- c. People: 65 sf/person

6. Air Distribution Requirements for Cooling System Design:

CFM

- a. Retail: 1.30 cfm/sq. ft.
- b. Interior Retail: 1.00 cfm/sq. ft.
- c. Storage: 0.50 cfm/sq. ft.
- d. Open Seating/Bar: 1.50 cfm/sq. ft.

7. Occupancy:

- a. Occupancy as determined by the Architect.

B. Mechanical System Description:

1. Single Zone Direct Expansion, Gas Fired Rooftop Units:

- a. Existing rooftop units to remain. Contractor shall wash down coils, replace belts, confirm refrigerant charge and provide new filters for each. All ventilation air shall be handled thru the rooftop units. Ceiling plenums shall be utilized as return air pathways. Supply air shall be distributed overhead thru externally wrapped ductwork with ceiling supply diffusers or grilles. Ductwork exposed to view in finished spaces shall not be externally insulated. Confirm size of existing ductwork for reuse and extend or reconfigure as required. Mechanical contractor shall verify rooftop unit condition and operation prior to test and balance.
- b. Heating Only Systems:
 - 1) Provide minimum 5 kW (208/1) cabinet unit heater with disconnect at vestibule door to the exterior.

2. Air Distribution System:

- a. Exposed ductwork shall be round or flat oval spiral duct/rectangular with a mill phosphatized or paint grip finish for surfaces to be field painted.
- b. All branch take-offs shall be 45° high-efficiency take-offs.
- c. All runout to diffusers shall be provided with insulated, flexible duct with a maximum length of 5'-0".
- d. Acoustically lined transfer boots shall be provided in walls to structure.

DIFFUSER SCHEDULE

TYPE	MANUFACTURER	MODEL	FACE TYPE	MOUNTING LOCATION	NOTES
SUPPLY	PRICE	SPD	SQUARE PLAQUE	CEILING	1,2,3,4
SUPPLY	PRICE	PDS	PERFORATED	CEILING	1,2,3,4
SUPPLY	PRICE	520	LOUVERED GRILLE	SIDEWALL	1,4
SUPPLY	PRICE	SDS	LINEAR SLOT	CEILING	1,3,4
RETURN	PRICE	PDDR	PERFORATED	CEILING	1,3,4
RETURN	PRICE	80	EGG CRATE	CEILING	1,3,4
RETURN	PRICE	520	LOUVERED GRILLE	SIDEWALL	1,4
NOTES: 1. MAX PRESSURE DROP SHALL NOT EXCEED 0.1" W.G. 2. 4-WAY THROW PATTERN. 3. FRAME TYPE TO MATCH CEILING CONSTRUCTION - COORDINATE WITH A/E 4. BAKED ENAMEL FINISH. COORDINATE WITH ARCHITECT FOR COLOR SELECTION. *CONTRACTOR SHALL VERIFY CEILING TYPE PRIOR TO ORDERING DIFFUSERS.					

3. HVAC Controls:

- a. The mechanical contractor shall coordinate all temperature control work with the building owner. The building system shall remain operational at all times.
- b. Replace existing thermostats/sensors with new. Thermostat covers shall be white in color unless otherwise noted. Thermostats/sensors shall be installed and calibrated prior to test and balance. Integrate new digital thermostats/sensors into the existing building controls.

4. Testing, Adjusting and Balancing (TAB):

- a. System shall be balanced per NEBB standards.
- b. Contractor shall provide testing and balancing of tenant finish space. This shall include coordination with the base building testing and balancing agency, temperature control vendor and commissioning agent.

II. HEATING, VENTILATION, AND AIR CONDITIONING SPECIFICATION

C. Scope:

1. The work included under this contract consists of providing all labor, materials, tools, transportation, services, etc., necessary to complete the installation of the heating, ventilating, and air conditioning systems and other items herein listed and as described in these specifications, as illustrated in the accompanying drawings or as directed by the Architect/Engineer.

D. Sheet Metal:

1. Ductwork shall be new prime grade galvanized steel sheets constructed per ASHRAE and SMACNA Standards. Duct system(s) installation shall be in accordance with SMACNA Duct Construction Standards Manual and industry standards. Provide round or rectangular duct as indicated.
2. Fabricate for the pressure and SMACNA seal class required by the application.
 - a. Leakage class minimum requirements are:
 - 1) Up to 2" WG Pressure: Rectangular, Class 24, Round, Class 12.
 - b. Seal class minimum requirements are:
 - 1) Up to 2" WG Pressure: Class A, all duct joints.
3. Flexible duct and accessories shall be UL-181 Class 1 compliant, 25/50 smoke and flame plenum rated. Maximum length shall be 5' - 0". Flexible duct shall have ends banded and insulation ends sealed. Attach with duct strap ties. Provide Thermaflex or equivalent flex tie supports. Supply air and return air flexible ducts and boots shall be insulated. Exhaust flexible duct shall not be insulated.
 - a. Insulated: Thermaflex G-KM, CPE Core on helix wire with R4.2 insulation and polyethylene vapor barrier jacket, with maximum velocity of 5,000 FPM, pressure of 6" WG positive and 1" negative.
 - b. Flexible ducts shall be Thermaflex or acceptable equal by ATCO or Flexmaster.

E. Ductwork Accessories:

1. Provide single thickness turning vanes in all supply duct turns.
2. Branch take-offs to air terminal units shall be high efficiency type.
3. All take-offs to diffusers and grilles shall be made with high efficiency take-offs, 45° take-offs or conical fittings. Provide locking quadrant volume damper at take-offs in accessible ceilings, unless shown otherwise. Extractors and scoops are not permitted.
4. Duct splits, elbows and reducing fittings shall be fabricated per SMACNA standards. "Ductmate" or acceptable equal flanged and gasketed joint systems are approved.

5. Provide dampers where shown and required. Dampers shall be by Greenheck or acceptable equal by Ruskin, American Warming & Ventilating, Air Balance, Inc., Carnes, Krueger, Nailor, United Enertech.

- a. Damper Schedule:

- 1) Manual Damper: Galvanized Steel Formed Blade, Manual Locking Quadrant Actuator, 4" WG, 2000 FPM.
- 2) Fire Smoke Damper: Rectangular or Type R, O, Class 1, 4" WG, 4000 FPM, Galvanized Steel, 1-½ hr., UL555S.

F. Grilles, Registers, Inlets and Outlets:

1. All supply, return and exhaust grilles, registers and diffusers shall be of commercial quality: E.H. Price or acceptable equal by Titus, Carnes, Krueger or Nailor.
 - a. All air distribution devices shall be selected for throw and low noise (25 NC or less) performance characteristics, unless otherwise indicated.
 - b. Louvered Supply Grilles shall be double deflection devices with front blades parallel to the long dimension, unless otherwise indicated.
 - c. Balancing Damper shall be provided for each and every diffuser, register and grille where airflow control is required. Provide integral volume damper where a duct mounted damper would not be accessible, unless otherwise indicated.
 - d. Ceiling Supply Diffuser Connection shall be made with hard elbow or flex duct with Thermaflex flex flow elbow support.
2. Louvers shall be AMCA Certified, extruded aluminum drainable blade with bird screen, finish as noted on drawings or acceptable equal by Ruskin, Carnes, American Warming and Ventilating, Louvers and Dampers, Nailor.

G. Controls and Low Voltage Systems:

1. Existing building controls shall be updated to include floor plan graphical revisions, equipment changes and/or additions and zoning changes. Provide any required software updates. Contractor responsible for coordinating any campus requirements as required.

H. Insulation:

1. Ductwork:

- a. Line low velocity rectangular supply ductwork with mat faced 3 lb. density fiberglass or textile liner with anti-microbial coating. Apply with mastic and pins with erosion protection on all exposed edges.
 - 1) Liner to be 1/2" thick for ducts in conditioned space or plenums utilized for return air.

2) Line sheet-metal return air boots with 1" thick 3 lb. density liner.

- b. Wrap all concealed medium/high velocity round and rectangular with 1-1/2" thick 0.75 lb. density flexible fiberglass ductwork insulation with laminated jacket of bonded aluminum foil and Kraft paper with a glass fiber reinforcing FSK).
- c. Wrap all concealed spiral or snap-lock (round) low pressure duct run-outs to supply grilles, registers, and diffusers with 1-1/2" thick, 0.75 lb. density fiberglass wrap with vapor barrier.
- d. Do not externally insulate ductwork exposed to view in finished space.

I. Equipment and Pipe Labels:

- 1. Equipment labels shall be provided for all mechanical equipment and shall be self-adhesive engraved plastic, blue with white lettering, sized, minimum 1-1/2" high, and located for viewing from ground or floor level. Label shall indicate drawing designation or unique equipment number.

J. Testing and Adjusting:

- 1. Contractor shall operate and test the air conditioning and ventilation systems and instruct the Owner in its operation. Perform a series of general capacity and operating tests. The tests shall demonstrate the specified capacities of various pieces of equipment.
- 2. The entire temperature controls systems shall be adjusted and balanced and put in operating condition to cause the equipment to maintain the temperatures in accordance with the intent of these specifications. Operate and test equipment during summer and winter seasonal startup under this contract.
- 3. Submit the complete test and balance report for review to the Architect/Engineer in triplicate. Test procedure and report shall conform to NEBB or AABC standards. The report shall be signed by the responsible individual.

END OF SECTION - MECHANICAL