SECTION 233113 - LOW-PRESSURE DUCTWORK

PART 1-GENERAL

1.1 SECTION INCLUDES

A. Low pressure supply sheet metal ductwork., (2-inch wg pressure class).

B. Low pressure return, relief and exhaust sheet metal ductwork., (2-inch wg pressure class).

C. Duct insulation liner. Only use where indicated on drawings.

D. Low pressure aluminum ductwork.

1.2 SUBMITTALS

A. Submit shop drawings and product data per applicable Division I Specifications.

B. Submittals are required and shall include 1/4 inch scale layout shop drawings showing duct location, sizes, duct fittings, gauges, sizes, welds, volume dampers, elevations and air flow quantities for each air terminal device. Electronic drawing files of floor plans and structural plans are available from the Architect/Engineer upon request. Submittal shall be approved prior to start of work on any system.

1.3 QUALITY ASSURANCE

A. SMACNA HVAC Duct Construction Standards-Metal and Flexible.

B. UL181.

C. NAIMA AH124-94: Fibrous Glass Duct Liner Standard.

D. NFPA 90A and 90B.

E. ASHRAE Handbook, HVAC Systems and Equipment.

F. Ductwork shall be sealed and leak tested as required by ASHRAE standard 90.1

1.4 WARRANTY

A. Contractor shall warranty entire systems and equipment for a period of one (1) year.

PART 2-PRODUCTS

2.1 COMPONENTS

A. Supply air, return air, relief air and exhaust air (except shower rooms) shall be galvanized steel lock-forming quality ASTM A 653/A 653/M, G90 (Z275) coating designation; milli-phosphatized finish for surfaces of ducts exposed to view. Gauges shall be per the latest issue of SMACNA for listed pressure requirements.

1. Provide Class A seals for all joints.

    a. Manufacturers

        1. Hardcast

        2. Benjamin Foster

        3. United McGill

    b. Non – hardening, water resistant, fire resistant, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

2. Hanger Rod: ASTM A36; steel threaded both ends, threaded one end, or continuously threaded.

B. Shower exhaust ductwork shall be aluminum construction conforming to ASTM B 209 Alloy 3003, Temper H14, Gauges shall be per the latest issue of SMACNA for listed pressure requirements. Seal all joints liquid-tight.

C. Flexible duct liner shall be a minimum of 1 inch thick and shall be applied in accordance with the latest addition of the SMACNA's Duct Liner Application Standard. All dimension shown on the plans are inside duct dimension and do not include the dimension of the duct liner.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Construct T’s bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide double wall turning vanes of preformed metal with glass fiber insulation.

C. Increase duct size gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

2.3 CASINGS

A. Fabricate casings in accordance with SMACNA HVAC Duct Construction Standards – Metal and flexible and construct of galvanized steel for operating pressures indicated with galvanized steel angle reinforcement.

B. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection. Provide clear wire glass observation ports, minimum 6X6 inch size.

2.4 DUCT LINING

A. Line ductwork with duct liner as indicated.

B. Duct lining shall be 1” thick installed with adhesive and clip fasteners per manufacturer’s recommendations.

PART 3-EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible. Seal class ‘A’ for all ductwork above 2” pressure class.

C. Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

F. Use double nuts and lock washers on threaded rod supports.

G. Install 1” x 18 gauge hanger straps or trapeze hangers. Ducts shall not be supported from metal ducts.

H. The contractor shall install the ducts and flues indicated on the drawings making all necessary changes in cross sections, offset, etc. whether or not same specifically indicated. If a duct cannot be run as shown on the drawings, the Contractor shall install the duct between the required points by any path available, subject to approval of the Architect

I. Install sheet metal sleeves for all ductwork passing through floors, wall, partitions, etc. Sleeves for insulated duct shall be large enough to allow insulation to pass through a sleeve. A 3” high concrete curb shall be provided around all duct openings through equipment room floors, floors in wet areas, and floor that are slab on grade. Refer to structural details for construction information.

J. All vertical ducts or risers shall be self-supporting and shall be complete in themselves, no single thickness partitions between ducts being permitted.

K. Provide “flexible” connections as noted on drawings between ducts and fans with 1” slack.

L. No pipes or other obstructions shall pass through air ducts.

M. All ducts at ceilings shall be run in such a manner as to maintain a maximum headroom in all rooms and corridors.

N. Ducts must be installed at such times as the construction alterations of the building will permit or as required by the Architects.

O. The Sheet Metal Contractor shall set all automatic louver dampers furnished by the Temperature Control Contractor which includes pressure relief dampers, and combustion air dampers.

Note: Where ducts pass through fire stops or fire walls, provide a steel sleeve as detailed on the drawings and required by NFPA Bulletin No. 90A. There shall be no openings between the steel sleeve and the fire partition.

P. Sheet Metal Contractor shall certify by letter to the Architect that all fire dampers have been installed as called for on the drawings and that all fire dampers are in proper operating condition.

Q. Connect terminal units to supply ducts with two feet maximum length of high pressure, flexible duct. Do not use flexible duct to change direction.

R. Connect diffusers to low pressure ducts with 5 feet maximum length of flexible duct held in place with strap or clamp except where noted on drawings to use double-wall insulated spiral duct.

S. Connect flexible ducts to metal ducts with adhesive, plus stainless- steel draw bands. Maximum length shall be 5’-0” with no more than two 90 degrees elbows as installed. Connect to ducts with fittings with integral air extractor and balancing damper.

T. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.

U. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 SCHEDULES

A. Ductwork Material Schedule

Low Pressure Ductwork

Low pressure rectangular ducts shall be made up of the following gauge metal:

Ducts up to and including 12”	- #26 U.S.S. Ga.
Ducts 13” to 30”	- #24 U.S.S. Ga.
Ducts 31” to 48”	- #22 U.S.S. Ga.
Ducts 49” to 72”	- #20 U.S.S. Ga.
Ducts over 72”	- #18 U.S.S Ga.
Plenums	- #18 U.S.S. Ga.

The sizes given above are the greatest dimensions or longest side of duct.

Construct all low pressure duct to SMACNA 2" W.G. pressure class.

Low pressure rectangular ducts shall be reinforced with galvanized angles conforming to the following schedule.

Dimensions of longest side Of duct, Inches	Reinforcing and Spacing
Up to and including 18"	None Required
Duct 19" to 42"	1"x1"x1/8" @ 60 in.
Ducts 43" to 48"	1 ½" x 1 ½" x 1/8" @ 60"
Ducts 49" to 60"	1 ½" x 1 ½" x 1/8" @ 48"
Ducts 61" to 84"	1 ½" x 1 ½" x 1/8" @ 24"

B. Round low pressure duct shall be longitudinal seam round duct, and fittings.
   1. Manufacturers:
      a. United Sheet Metal
      b. Semco
      c. Lindlab Spiral 7 Shop Fabricated Fittings

END OF SECTION 233113

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