SECTION 15840

AIR DISTRIBUTION

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Ductwork, accessories and air outlets shall meet the requirements of NFPA 90A, Air Conditioning and Ventilating Systems.

B. Fabricate in accordance with ASHRAE handbooks and SMACNA duct manuals.

C. Rate air control louvers in accordance with AMCA 500 and 511.

D. Fire dampers shall be UL listed and constructed in accordance with UL Standard 555 Fire Dampers.

E. Fusible links on fire dampers shall be constructed to UL standard 33, Fusible Links for Fire Protection Service.

F. Demonstrate re-setting of fire dampers to authorities having jurisdiction and Owner's representative.

G. Make air flow tests and sound level measurements in accordance with applicable ADC equipment test codes and ASHRAE Standards.

H. Manufacturer shall certify cataloged performance in accordance with ADC Test Code 1062 and ensure correct application of air outlet types.

1.2 JOB CONDITIONS

A. Review requirements of air outlets as to size, finish, and type of mounting prior to submitting shop drawings and schedules of outlets.

B. Check location of outlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

1.3 DEFINITIONS

A. Duct Sizes - rectangular duct dimensions are inside and round duct sizes are inside dimensions.

B. Low pressure - static pressure in duct 2 inch w.g. and velocities up to 2000 fpm..

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ducts - galvanized steel lock forming quality, having zinc coating of 1.25 ounces per square foot for each side.

B. Fasteners - use rivets and bolts throughout, sheet metal screws accepted on low pressure ducts.

C. Sealant - water resistant, fire resistive, compatible with mating materials.

D. Duct liner - One inch thick glass fiber, l-1/2 pounds per cubic foot density, maximum "K" value of 0.26 BTU/sq. ft. with surface in air stream coated with a Neoprene or vinyl coating. Lining shall meet UL fire hazard classification of: flame spread, 25; smoke developed, 10.

E. Insulated low pressure flexible duct - factory fabricated assembly consisting of a zinc-coated spring steel helix, non-perforated inner liner, wrapped with a nominal 1 inch thick by 1 lb/cu. ft. density, maximum “K" value of 0.23 BTU/sq. ft. fiberglass insulation. The assembly shall be sheathed in a vapor barrier jacket, factory sealed in both ends of each section. The composite assembly, including insulation and vapor barrier, shall meet the Class 1 requirements of N.F.P.A. Bulletin No. 90A and be labeled by Underwriter's Laboratories, Inc.

F. Outside duct insulation - 2" thick, 3/4 pound per cubic foot density fiberglass, maximum "K" factor per ASTM C 518 of 0.32 BTU/hr/sq. ft. at 75 degrees F. mean temperature and a foil/kraft reinforced laminate vapor barrier facing complying with NFPA-90A with fire and smoke hazard rating as determined by UL 732, ASTM E 84, and NFPA 255 not to exceed flame spread of 25 and a smoke developed of 50. Maximum permeability of facing shall be 0.20 per ASTM E 96. Insulating value shall comply with ASHRAE 90.1 FOR South Louisiana.

2.2 ACCESS DOORS

A. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum 1 inch thick insulation with sheet metal cover.

B. Provide two hinges and two sash locks for sizes up to 18 inch square, two hinges and two compression latches with outside and inside handles for sizes up to 24 inch x 48 inch. Provide an additional hinge for larger sizes.

2.3 FIRE AND SMOKE DAMPERS

A. Fabricate of galvanized steel, weighted to close and lock in closed position when released.

B. Fire and smoke dampers activated by smoke detector shall be multi-blade type, UL listed for smoke and fire with fusible link and linkage for motor operator to hold damper open except when activated. Fire dampers may be curtain type with blades outside duct.

C. Fabricate combination fire and balancing dampers with linkage readily adjustable with damper in open position.

D. Set or select fusible links for 160 degrees F. release unless shown otherwise.

E. Smoke damper shall be tight closing and designed to retard the spread of smoke and other fire products.

2.4 DAMPERS

A. Fabricate of galvanized steel, minimum 16 gauge, and provide with quadrants or adjustment rod and lock screw.

B. Fabricate splitter dampers of double thickness sheet metal to streamline shape, properly stiffened to avoid vibration. Size on the basis of straight air volume proportioning.

C. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 6 inch x 72 inch. Assemble center and edge crimped blade in prime coated or galvanized channel frame with suitable hardware.

D. Construct damper blades to block a maximum of 70% of the air passage. Supply locking type handles.

E. Fabricate multi-blade, parallel action gravity balanced backdraft dampers with blades of maximum of 6 inch width having felt or flexible vinyl sealing edges, linked together in rattle-free manner and with adjustment device to permit setting for varying differential static pressure.

2.5 FLEXIBLE CONNECTIONS: Flexible connections: Fabricate of UL approved, vinyl plastic coated aluminized finished heat resistant (250 degrees) waterproof fiberglass fabric, minimum 3 inches wide tightly crimped into metal edging strip and attached to ducting and equipment by screws or bolts at 6 inch intervals.

2.6 ELECTRIC HEATERS: Provide slip in electric heating coils with insulated and hinged control box, aluminized steel hardware, ceramic insulators, 80% nickel, 20% chromium wire elements with maximum loading of 35 watts per square inch, low voltage control pneumatic electric switches, power circuit fuses, subdivided if current is over 48 amps, automatic and manual reset high limits, and air flow interlock switch. Heaters shall be UL approved and meet National Electric Code.

2.7 AIR OUTLETS, DIFFUSERS, GRILLES AND REGISTERS: Provide manufacturer's standard aluminum material, as drawn, of size, shape, capacity, type and blow as indicated. Fabricate aluminum extrusions with prime coat finish unless indicated otherwise.

2.8 AIR CONTROL LOUVERS: Extruded aluminum drainable, 4" deep stationary blades set between 30 degrees and 45 degrees with "K" type blade. Water penetration shall be

negligible at 1000 FPM. Free area velocity and static pressure drop shall not exceed 0.1 in. w.g. at this velocity.

2.9 FABRICATION

A. Size round ducts installed in place of rectangular ducts from ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.

B. Complete ducts within themselves with no single partition between ducts. Where widths of duct exceeds 18 inches, cross break for rigidity. Open corners are not acceptable.

C. Lap metal ducts in direction of air flow. Hammer down edges and slips to leave smooth duct interior.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Maximum divergence upstream of equipment to be 30 degrees and 45 degrees convergence downstream.

E. Rigidly construct metal ducts with joints mechanically tight, substantially air tight, braced and stiffened so as not to breathe, rattle, vibrate or sag. Caulk duct joints and connections with sealant as ducts are being assembled.

F. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10% duct area, split into two ducts maintaining original duct area.

G. Provide double thickness hollow air foil type turning vanes at all corners indicated on plans. In lieu of, and where sufficient clearance exists, elbows and tees may have turning of 1-1/2 times width of duct on center line.

H. Provide splitter dampers which shall be at least 2 gauges heavier than ducts as shown. Dampers shall have locking quadrants when concealed in ceiling, and access.

I. Provide UL rated fire dampers where ducts pass through a 2 hour or more rated fire partition and at outside air intakes, as drawn and required by NFPA.

J. Provide approved smoke dampers where ducts pass through smoke rated partitions, as drawn and as required by NFPA.

K. Provide at each branch takeoff to a single grille or diffuser, a device that will scoop air and direct evenly to the grille or diffuser. Provide adjustment through grille or diffuser face or accessible linkage through duct.

L. Apply duct liner to inside at the duct with the sprayed side to the air stream, and secure to the duct with adhesive, completely coating the clean sheet metal. All joints in the insulation shall be firmly butted and tightly sealed with adhesive. On ducts over 24" in width or breadth, further secure the liner with sheet metal screws and caps or welded pins placed on not less than 18" centers both vertical and horizontal, and pointed up with adhesive. Liner shall be accurately cut and ends thoroughly coated with adhesive so that when the duct section is installed the liner shall make a firmly butted and tightly sealed joint.

M. Provide necessary baffling in mixed air plenums to ensure good mixed air temperature.

N. Staple all seams on minimum 2 inch centers. Close with manufacturers' recommended bonding system. Provide extra wrappings of closure strip at duct supports. Keep joining surfaces clean. Reinforce all ducts over 22 inches with tee sections as specified. Space reinforcing according to Table 1 of SMACNA duct manual. Support ductwork at all turns, transitions and minimum six (6) foot centers on straight runs.

PART 3 - EXECUTION

3.1 Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube opening 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 insulation ductwork, install insulation material inside the metal ring.

3.2 Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning.

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

3.4 Connect diffusers to rectangular ducts with 10 ft. maximum length of flexible duct. Hold in place with strap or clamp. Connect to duct with spin-in type fitting which shall include adjustable damper and extractor fitting. Wrap fitting with 1 inch thick glass fiber insulation with completely sealed vapor barrier. Install in a fully extended condition free at sags and kinks. Support on maximum 35 inch centers with minimum 3/4 inch wide flat strap. Positively seal all joints and connections with ½ inch wide positive locking steel strap.

3.5 Where ducts pass through walls, floors or partitions, completely seal the space around the duct with rope asbestos, mineral wool or other fireproof material.

3.6 Install flexible connections immediately adjacent to equipment subject to vibration.

3.7 Install balancing dampers as drawn and as required for air balancing.

3.8 Supply, return and outside air ductwork diffusers and fittings not internally lined shall be externally wrapped and outside duct insulation and. vapor barrier completely sealed according to manufacturers' printed instruction.

3.9 Seal all joints and seams in metal ductwork with pressure sensitive tape adhesive bonded to an aluminized mylar backing equal to "Hard Cast".

3.10 Provide access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Review locations prior to fabrication.

3.11 Provide 4 inch x 4 inch quick opening access doors for inspection at balancing dampers.

3.12 Provide fire and smoke dampers at locations shown, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Dampers shall be complete with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings, and hinges.

3.13 Rate air outlets in accordance with ADC standards.

3.14 Base air outlet selection on space noise of NC 30 maximum.

END OF SECTION