

PART 1 GENERAL

1.01 Purpose:

- A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. The responsibility of the engineer is to apply the principles of this section such that the University may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be justified through LCC analysis and submitted to the University for approval.

1.02 References:

- A. Codes and Standards that are Standard at the University:

1.03 Requirements:

- A. Medium and high-pressure ductwork is hereby defined as ductwork subject to operating pressures in excess of 2" w.g., positive or negative.
- B. Low pressure ductwork is hereby defined as ductwork subjected to velocities of 2500 fpm or less, and operating pressure of 2" w.g. or less, positive or negative.
- C. Seal ductwork to SMACNA seal Class A. All sealant shall be UL rated with NFPA flame spread of no more than 5 and smoke developed of 0.
- D. Provide balancing dampers with inspection ports at supply, return, and general exhaust branches when connected to larger ducts, as required, for air balancing.
- E. Ductwork taps shall be conical or clinch collar with 45 degree or boot connections.
- F. Connect air devices to low pressure ductwork with five-foot maximum length of flexible duct. Connections to Air devices and changes in direction shall be made with hard sheet metal duct elbows.
- G. Provide long-radius elbows ($R/D = 1.5$) unless otherwise indicated.
- H. Transition duct sizes gradually, not exceeding 20 degrees divergence and 30 degrees convergence.
- I. Provide flexible duct connection on all rotating equipment.
- J. Duct sizes shown on drawings shall represent the inside air stream clear area. No interior lined ductwork allowed at SHSU.
- K. Pressure class, as defined by SMACNA, shall be clearly indicated on drawings with appropriate symbols.
- L. Refer to section 5.23.07 for ductwork insulation requirements.

- M. For noise-prone and/or noise-sensitive applications, provide double-wall ductwork with a perforated inner liner for a minimum of ten feet after the first elbow from both supply and return plenums of the air handling unit(s). Liner shall be 2" thick, tested against erosion to at least 110% of scheduled duct velocity, and treated with an anti-microbial surface coating.
- N. Ducts entering and exiting air handling units shall be labeled as outdoor air, supply air, return air, exhaust air or relief air. Labels shall be visible and legible from floor level and include airflow direction.
- O. **No** internally insulated ducts shall be used on SHSU campuses.

PART 2 PRODUCTS

2.01 Materials:

- A. Ductwork Materials: Provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discoloration, and other imperfections, including those which would impair painting.
- B. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lock forming quality; with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations.
- C. Corrosive Fume Exhaust: Typically 304L stainless steel with welded seams unless nature of corrosive fumes require otherwise.
- D. Contact Molded Fiberglass Reinforced Plastic: The National Bureau of Standards "Voluntary Product Standard, PS-15-69" shall form the minimum basis for the fabrication of these FRP exhaust duct systems. Resin used shall be the Hetron 197 for its fire retardant and corrosion resistant properties.
- E. Flexible Ducts: Mechanical lock helix with an insulated, UL-181/ETL Class I AIR DUCT. The HELIX shall be made with corrosion resistant galvanized steel, formed and mechanically locked to the liner. The liner shall be fabricated with an acoustically transparent CPE inner film that is mechanically locked without adhesives. The flexible duct shall be factory wrapped with a fiberglass insulation blanket with a R-8 Thermal Conductance and enclosed by a fire retardant, reinforced aluminum material vapor barrier. The flexible duct shall have a rated working pressure of two inches (2") W.G. positive and one and a half inches (1.5") W.G. negative for low pressure ducts. Preferred manufacturer: FLEXMASTER TYPE 8M
- F. Flexible Duct Connectors: UL Listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 20 ounce per square yard. Provide electrical bonding jumpers across flexible connection.
- G. The damper shafts shall be round and operate in Sintered Bronze self-lubricating bearings. The end of the shaft at the operator end shall be scored in line with the damper blade to reference the damper blade position.

PART 3 EXECUTION

3.01 Installation of Ductwork:

- A. **General:** Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable braces, and anchors of type which will hold ducts true-to-shape and to prevent buckling.
- B. **Penetrations:** Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2". Fasten to duct and substrate.
- C. Provide fire or fire-smoke dampers as required by Code. Adequate access to all dampers must be provided for service and inspection.

3.02 Testing:

- A. **Medium Pressure Leakage:** After medium pressure duct system is constructed, test for duct leakage in accordance with the latest versions of ASHRAE 90.1 and SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than 1% of system design airflow when the system is pressurized to the design duct pressure class rating.

END OF STANDARD