

SECTION 23 31 00  
DUCTWORK  
Design Standard

PART 1 GENERAL

1.1 PURPOSE:

Ductwork is an essential element of the mechanical space cooling and heating systems. This design standard has the purpose of creating a consistent application of ductwork requirements throughout the San Mateo County Community College District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

PART 2 PRODUCTS

2.1 DESIGN AND SPECIFY WORK TO INCLUDE MATERIALS, INSTALLATION AND TESTING OF HVAC DUCTWORK AND accessories, including the following:

Heating and air conditioning supply and return systems

Outside air systems

Exhaust systems

Ductwork hangers

Plenums

Gas vents

- A. Galvanized Steel Ductwork: Carbon steel, lock-forming quality, hot-dip galvanized, with spangle-type zinc coating, double seam without showing fracture. Conform to ASTM A525 and A527.
- B. ASHRAE and/or SMACNA shall be used as a guide.
- C. Design medium pressure ductwork at 0.1"/100' pressure drop.
- D. Design low pressure ductwork at 0.08"/100' Pressure classification shall be specified on the drawings.
- E. All metal ductwork shall be cross broken to ensure rigidity.
- F. Inlet and discharge ductwork configuration shall conform to the SMACNA HVAC Duct Design Manual.
- G. Seismic restraints shall be designed per SMACNA requirements.
- H. All ductwork located outdoors shall be designed to be waterproof and sloped for water run-off.
- I. Preinsulated flexible aluminum duct may be proposed for low pressure supply duct downstream of terminal or variable air volume boxes. If proposed, the base cost shall utilize all galvanized sheet metal ductwork with an alternate cost savings for the preinsulated flexible aluminum duct for determination if the cost savings is acceptable considering the reduced efficiency of the system. All preinsulated flexible aluminum duct shall be installed

with strict adherence concerning this ductwork concerning sag, radius of turns, fittings and support.

J. Flexible ducts:

1. Standard factory fabricated product, construct an inner wall of impervious vinyl or chlorinated polyethylene, permanently bonded to a vinyl or zinc-coated spring steel helix. Cover the assembly with fiberglass blanket insulation covered by an outer wall of vinyl or fiberglass-reinforced metalized vapor barrier. UL 181 listed Class 1 flexible air duct material. Overall thermal transmission no more than 0.25 (BTU/in)/(hr/sq.ft./deg. F) at 75F differential, per ASTM C335. Vapor transmission value no more than 0.10 perm, per ASTM E96. Rated for a minimum of 4-inch w.g. positive pressure and 1-inch w.g. negative pressure. Air friction correction factor of 1.3 maximum at 1000 FPM. Working air velocity of at least 2000 FPM. Flame spread rating no more than 25. Smoke development rating no more than 50 as tested per ASTM E84. Must have cataloged data on insertion loss characteristics, minimum attenuation of 29 DB for 10-foot straight length at 8-inch diameter and 500 Hz.
2. Install flexible duct with bend radius equal to 1.5 times the diameter. Minimum length 2 feet. Maximum length 5 feet.
3. Provide round neck grilles/diffusers or square-to-round transitions. No flex duct connections directly to square neck allowed. As an alternative to a transition, provide an acoustically lined plenum above the diffuser and connect to a round collar.
4. Flex duct allowed only for vertical drops to diffusers. Maximum offset angle from vertical: 30 degrees. As an alternative to a transition, provide an acoustically lined plenum above the diffuser and connect to a round collar.
5. Approved for use on supply ducts only; not allowed for return or exhaust.
6. Flex duct allowed in concealed spaces above lay-in ceilings only

K. Positive pressure gas vents:

1. Doublewalled insulated piping system. Construct the inner wall of at least 0.035 inch-thick Type 304 stainless steel. Construct the outer wall of at least 0.025 inch-thick aluminized steel. Fabricate duct to provide space between the inner and outer walls of at least 1 inch. List system by UL as 1400F Factory Built Chimneys with 2-inch clearance to combustibles for use with No. 2 fuel oil-fired equipment. Join sections by means of a system, capable of sealing gastight to pressure up to at least 60-inch w.g. for temperatures up to 600F. Fittings of the same manufacture and construction as the straight sections

L. Gravity gas vents:

1. Type "B" factory fabricated, UL listed, doublewall flue, with aluminum inner wall, galvanized steel outer wall and 1/2-inch air space between unless noted otherwise. Provide twist-lock connectors, tall cone flashing, storm collar, and round birdproof/weatherproof top

2.2 APPROVED MANUFACTURERS:

A. Flexible ducts:

1. J. P. Lamborn Co.
2. Norflex

- 3. Clevaflex
- 4. Genflex
- 5. Atco
- 6. Flexmaster
- 7. Thermaflex
- B. Positive pressure gas vents:
  - 1. Ampco
  - 2. Selkirk
  - 3. Metalbestos IPS
- C. In-Line Pumps:
  - 1. Ampco
  - 2. Selkirk
  - 3. Metalbestos IPS

PART 3 EXECUTION

3.1 SUBSTITUTES ALLOWED?

Yes, if performance and quality equivalency can be evidenced.

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS:

23 05 29 - Hangers and Supports for HVAC Piping and Equipment Design Standards

23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment Design Standards

23 05 53 - Identification for HVAC Piping and Equipment Design Standards

END OF SECTION