Design Standard
Ductwork

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 East Side Union High School District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

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

- 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.
- ASHRAE and/or SMACNA shall be used as a guide.
- Design medium pressure ductwork at 0.1”/100’ pressure drop
- Design low pressure ductwork at 0.08”/100’Pressure classification shall be specified on the drawings.
- All metal ductwork shall be cross broken to ensure rigidity.
- Inlet and discharge ductwork configuration shall conform to the SMACNA HVAC Duct Design Manual.
- Seismic restraints shall be designed per SMACNA requirements
- All ductwork located outdoors shall be designed to be waterproof and sloped for water run-off
- Flexible ducts:
  - 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.

- Install flexible duct with bend radius equal to 1.5 times the diameter. Minimum length 2 feet. Maximum length 5 feet.
- Provide round neck grilles/diffusers or square-to-round transitions. No flex duct connections directly to square neck allowed.
- Flex duct allowed only for vertical drops to diffusers. Maximum offset angle from vertical: 30 degrees.
- Approved for use on supply ducts only; not allowed for return or exhaust.
- Flex duct allowed in concealed spaces above lay-in ceilings only

Approved Manufacturers:

- Flexible ducts
  - J. P. Lamborn Co.
  - Norflex
  - Clevaflex
  - Genflex
  - Atco
  - Flexmaster
  - Thermaflex
- In-Line Pumps
  - Ampco
  - Selkirk
  - Metalbestos IPS

Substitutes Allowed:

Yes, if performance and quality equivalency can be evidenced.

Associated Design Standards and Construction Specifications

- Division 23 HVAC Design Standards
- 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

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