SECTION 23 31 13

HVAC DUCTS

PART 1: GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 **LESSONS LEARNED AND DESIGN CONSIDERATIONS**

A. Connect air devices to low pressure ductwork with 6 foot maximum length of flexible duct and provide a Flex-Flow elbow or metal elbow.

B. Designer will be aware of system effect and design duct systems to minimize or eliminate system effect to ensure the fans performance are not reduced. System effect leads to more power consumption, due to higher fan speeds and lower efficiencies, increased vibration and increased acoustical effects occur as well. The PSP must have understanding of inlet and outlet conditions of different fan types and design the ductwork accordingly. Most common causes of system effect are abrupt elbows entering or leaving fans, fans discharge directly into a plenums, abrupt duct transitions, inlets/outlets too close to a wall or ceiling or fan inlet dampers. Adding some additional cost to the project budget to minimize/eliminate system effect is supported by UTA.

C. Ductwork outdoors will be double wall insulated duct.

D. Minimize the use of duct liner, if needed for acoustical considerations use closed cell elastomeric insulation. No fiberglass will be used inside ductwork.

E. Support flexible ductwork per SMACNA specification for supporting flexible duct and additional guidance from the Air Diffusion Council's "Flexible Duct Performance and Installation Standards". Provide installation details for supporting flexible ductwork.

F. Avoid using splitter dampers or air extractors in duct designs.

G. Design duct systems to SMACNA's "HVAC Duct Construction Standards Metal and Flexible".

H. Design duct systems with allowance for other trades using the same area. Duct systems should designed for a minimum of 1 inch clearance around the duct or duct insulation from columns, ceilings, and other ductwork. If ductwork needs to be stacked vertically ensure the contractor can install the ductwork in a manner that will prevent insulation damage and proper inspections.

I. All ductwork with pressure class greater than 2 inwg. will be leak tested to a maximum of 1.0 % of design flow.

J. Access doors will be required for access to fire/smoke dampers.

K. Fabric ductwork can be used for certain applications if approved by UTA. Duct Sox brand or equal is acceptable.

L. All mitered elbows will have single thickness turning vanes.

PART 2 - PRODUCTS

2.1 GENERAL

A. This product section is intended to inform the PSP on the minimum standard of quality that should be incorporated in new designs. The PSP should evaluate these standards and incorporate or make additional requirements per project specific requirements. Where the PSP considers any requirement listed not to be applicable or incompatible with the project design intent should be discussed with UTA Office of Facilities Management.

2.2 PRODUCTS

A. Low pressure ductwork

1. Defined as ductwork downstream of terminal units and exhaust ductwork downstream of fans.

2. Metal gauge shall be as a minimum listed in SMACNA HVAC Duct Construction Standards – "Metal and Flexible".

3. Long Radius Elbow will be used. Elbows in round ducts may be smooth radius or 5 piece 90 degree elbows.

4. All ductwork seams, field or shop, will have sealant applied at installation.

B. Medium Pressure Ductwork:

1. All ductwork downstream of Air Handlers up to and including terminal units and all return air ductwork.

2. Metal gauge shall be as a minimum listed in SMACNA HVAC Duct Construction Standards – "Metal and Flexible".

3. Long Radius Elbow will be used. Elbows in round ducts may be smooth radius or 5 piece 90 degree elbows.

4. All ductwork seams, field or shop, will have sealant applied at installation.

C. Elbows:

1. Rectangular elbows are required to have single thickness turning vanes installed. Vanes must be fabricated for the same angle as the rectangular elbow. Field fabricated turning vanes will not be allowed.

2. All round elbows will be long radius elbows.

D. Flexible Ducts:

1. Factory preinsulated duct from spiral wound corrugated aluminum core covered with a minimum of 1-1/2 inch thick ¾ lb density fiberglass insulation blanket sheathed in a vapor barrier. Minimum "K" factor of 0.29 at 60 F. Positive pressure rating if 10 inwg.

E. Exterior Ductwork:

1. Double wall, insulated constructed of minimum 20 gauge galvanized sheet metal for inner and outer wall. Insulation will be 2 inches thick and a k-value of 0.25 or equivalent thickness and k-value.

2. Fittings: transverse duct connections with bolted and gasketed flanges.

F. Fume Hood Exhaust Duct:

1. Generally stainless steel construction from the fume hood collar to the exhaust main. Galvanized steel from the exhaust main to the exhaust outlet.

2. Generally Perchloric fume hood exhaust will be polypropylene duct.

3. Designer must analyze the hood use and recommend a particular material for a project.

PART 3 - EXECUTION

3.1 Ductwork will be sealed at all times during transport, storage and construction unless need to be removed for installation.

3.2 **Ductwork passing through walls or ceilings will have a metal sleeve install. The sleeve will be installed prior to the duct being installed through the penetration. Insulated ducts will have continuous insulation through the penetration.**

3.3 All ductwork arriving on site will be inspected for damage and cleanliness. Clean duct on site of needed before installation. Inspect turning vanes prior to installation for proper alignment.

3.4 **All takeoffs to an air device will have a manual balancing damper as close to the main duct as possible while maintaining accessibility. Round metal duct will be used to the diffuser then elbow down with flexible duct to the air device. A maximum of 5 feet of flexible duct will be used.**

END OF SECTION 23 31 13