

**1. DESIGN STANDARD:**

- 1.1 All duct systems must be designed in strict accordance with the latest editions of SMACNA, NFPA 90-A, IECC and applicable codes.
- 1.2 Low pressure duct systems are preferred. Systems in excess of 3 inches W.G. design pressure will be leak tested.
- 1.3 Elbowed change of plane transitions should be made to minimize pressure loss. Transitions should limit total angle of change to 30E. Elbows should be radius type or mitered with turning vanes. Do not apply turning vanes in double elbow applications or where successive elbowed plane changes occur in the duct system.
- 1.4 Duct board systems are not acceptable and any use of internal liner must be approved by Rice University's Project Manager.
- 1.5 Welded joint, stainless steel duct systems should be used for the following:
  - 1.5.1 Laboratory exhaust systems.
  - 1.5.2 Shower room exhaust systems.
  - 1.5.3 Unprotected exterior mounted ductwork.
  - 1.5.4 Drainable sections at duct mounted humidifiers and the like.
- 1.6 Welded joint, black or galvanized steel and stainless steel duct systems should be used for kitchen hood exhaust systems.
- 1.7 Manufactured spiral re-enforced galvanized steel duct systems should be considered for higher pressure supply and return systems. Snap lock duct is unacceptable in any application.

**2. PRODUCT STANDARD:**

- 2.1 Material for ductwork systems should be United States Domestic manufactured, galvanized prime grade, lock-forming quality, copper bearing steel sheets. Environmental exhaust systems should be similar except as noted otherwise.
- 2.2 Gauge and reinforcing must be as defined in the SMACNA manual for the respective pressure class. In acoustically sensitive spaces gauges in excess of SMACNA may be required.
- 2.3 Duct sealing must be SMACNA Class A. All longitudinal and transverse joints will be sealed. Water based sealants is preferred except in exterior duct applications solvent based sealants should be used in exterior applications.

- 2.4 Ductmate or equal sheet metal jointing systems may be proposed in lieu of duct sealant.
- 2.5 Acoustically sensitive applications that require the use of internally lined duct must be approved by the Rice University's Project Manager.
- 2.6 "Fiber Free" acoustical lining using sheet rubber material should be considered as replacement for glass fiber lining.
- 2.7 Flexible duct systems may be applied at terminal units and at air devices.
  - 2.7.1 Semi-rigid spiral locking flexible duct is preferred for connection to terminals.
  - 2.7.2 Semi-rigid spiral locking flexible duct is preferred for connection to terminals.
  - 2.7.3 All duct systems must be U.L. 181 listed for air duct systems.
  - 2.7.4 All flexible duct must be insulated and include an outer jacket for containment of the insulated covering.
  - 2.7.5 Jackets should be stenciled by the manufacturer to indicate the insulation R value.
- 2.8 Stainless steel duct systems should be 316 unless otherwise approved by the Rice University's Project Manager.
- 3 PERFORMANCE STANDARD:
  - 3.1 Duct support should be made using structural steel and threaded rod. Perforated strap suspension systems are not acceptable.
  - 3.2 Flexible duct systems should be secured at both ends with removable fasteners.
    - 3.2.1 Semi-rigid flexible duct should be connected with sheet metal screws and stainless steel banding on the outer jacket.
    - 3.2.2 Spiral wound flexible duct should be attached using stainless steel banding both at the duct collar and at the outer jacket.
    - 3.2.3 The length of flexible duct should be no more than required to make the connection and should not exceed six feet on any one connection.
  - 3.3 Duct systems must be proven leak free before insulation materials are applied.
    - 3.3.1 A duct system in excess of 3 inches W.G. must be pressure tested. All welded systems must be pressure tested. The pressure test should be made in accordance with SMACNA

and should achieve 1% maximum leakage criteria.

- 3.3.2 All duct systems must be visually and audibly inspected before insulation is applied. All apparent leaks must be repaired before insulation is applied.
- 3.3.3 Rice University's Project Manager must sign off on all duct inspection and testing.