

SECTION 15102 HVAC DUCTWORK, FITTINGS, ACCESSORIES

PART 1 – GENERAL

- 1.1 SCOPE: This Section details preferred product material and assembly requirements; system applications are described in other sections of this guide. It is recognized that deviations from the preferred materials and assemblies can occur responsive to special circumstances.
- 1.2 CODES & STANDARDS: HVAC systems shall be designed in compliance with all codes and standards as cited previously.

PART 2 – PRODUCTS

- 2.1 Ductwork
 - A. Galvanized (Low, Medium Pressure): Gauge, sealing, and pressure rating in accordance with SMACNA recommendations. Seal with appropriate mastic. All field-applied adhesives and sealants shall have a VOC content not to exceed 250 g/l.
 - B. Aluminum: Kitchen Heat exhaust, Type II Classification
 - C. Black Steel, welded: Kitchen hood exhaust, Type I Classification
 - D. Stainless Steel: Fume hood exhaust and chemical storage room exhaust.
 - E. Flexible Duct: Reinforced, flexible, insulated, 1" thick, 3/4 pound density with vapor barrier. UL approved for application, four feet maximum length. Provide self-sealing ductwork, requiring no adhesives, on all branch ducts; "SpiroSafe" or equal.
 - F. Lined: 1.5 pound density 1"-2" thick non-formaldehyde fiberglass ductliner with smooth black coated surface; all liner shall meet the Environmental Institute's Certification "Greenguard". The use of ductliner is to be kept to an absolute minimum as an air quality control measure.
- 2.2 Accessories
 - A. Dampers
 1. Manual Volume: Locking positioning handles. Include elevated platform for insulated duct mounting.
 2. Motor Operated: Low leakage; closed-cell neoprene edge seals.
 3. Fire / Smoke: As manufactured by Airstream Products, Phillips-Aire, Ruskin, or Prefco
 - a. Fire dampers shall be fusible link, equipped with non-corrosive hinge pin, providing positive lock in closed position. Dampers to have clear opening full size of ducts and air outlets. Provide access door. Fire dampers shall be.
 - b. Smoke dampers shall be combination smoke and fire damper, electric 2-position normally closed actuator, automatic reset. Coordinate with the Fire Alarm System.
 4. Backdraft: Multiple parallel blade, vinyl edge seals, adjustable tension return spring to permit setting for varying differential static pressure.
 - B. Duct Access Doors: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness for duct pressure class; piano hinge and cam latches.
 - C. Flexible Ducts: Black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor barrier film; stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action.
- 2.3 Diffusers, Grilles, Registers: Air outlets and inlets devices shall be fabricated by one manufacturer and shall be equal in appearance, material and performance; acceptable manufacturers are Carnes, MetalAire, Price, Titus.

- 2.4 Insulation: 2" fiberglass wrap, 0.26 Btu•in/(hr•ft²•°F), with all service jacket for concealed ductwork; 1" fiberglass board 0.23 Btu•in/(hr•ft²•°F) for exterior installations.

PART 3 – EXECUTION

3.1 Ductwork

- A. Ductwork Protection: Protect stored and installed ductwork from particulate, moisture and microbial contamination at all times during construction by sealing exposed ends and avoiding exposure to contamination in a manner consistent with Division 1 Indoor Air Quality Requirements. Ductwork that is judged by MCPS to have been contaminated during construction shall be cleaned to like-new condition. Document protection of ductwork and materials during construction with photographs according to LEED requirements
- B. Hanging, Supporting, Sealing, Leak Testing:
1. Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached. Duct hangers, when hung from joists, shall be secured to top cord of joists. Hangers shall be: galvanized sheet steel or threaded steel rod.
 2. Trapeze and Riser Supports: Galvanized-steel shapes and plates for galvanized ducts; stainless-steel support materials for stainless steel ducts. Supports for aluminum ducts shall be aluminum support materials unless materials are electrolytically separated from ducts.
 3. Ductwork shall be sealed on-site.
 4. Ductwork shall be leak tested in accordance with SMACNA recommendations; extent as follows:
 - a. Medium pressure - all.
 - b. Exhaust – fume hood exhaust, lab classroom purge exhaust, and chemical storage room exhaust.
 - c. Low pressure: return:
 - 1) Supply and return at heat pumps – sample test mock-up system and up to three additional locations selected by MCPS.
 - 2) Supply and return/exhaust for DOAS and RTU's/ERU's – all
- C. Avoid the use of exterior ductwork on roof areas; however, unavoidable, brace ducts every 36" of length, provide tapered insulation to create slopes on top horizontal surface, and provide water proofing seal on insulation.
- D. Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures. Ducts shall be kept as high as possible in mechanical rooms.
- E. The interiors of metal ducts seen through registers and grilles shall be painted black.
- F. Opposed blade dampers in diffusers and registers shall be used as a secondary means of balancing; primary balance shall be at duct dampers.
- 3.2 Duct Liner: Require transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Edge facings are required at fan discharges, intervals of lined duct preceding unlined duct, and upstream edges of transverse joints in ducts where air velocities are greater than 2500 fpm.
- 3.3 Smoke/Fire Detectors/Dampers:
- A. All duct smoke detectors must have clear identification and access in ceilings. Specify that all ceiling access doors to be minimum of 24" x 24".
 - B. The final construction documents must show clearly all fire dampers, smoke dampers, combination fire and smoke dampers, and duct smoke detectors at ALL locations, ducts, rated opening, elevator shaft and machine room, etc. in accordance with required codes and Fire Marshall.
- 3.4 Balancing Dampers: All supply and return branches shall have dampers at the take-off from the main.

- 3.5 Access Doors: Provide duct access doors:
 - A. Adjacent to fire or smoke dampers, providing access to reset or reinstall fusible links.
 - B. Adjacent to duct mounted coils.
 - C. Adjacent to motor operated duct dampers
- 3.6 Flexible Connectors, Ducts:
 - A. Provide flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
 - B. Connect flexible ducts to metal ducts and air terminals with draw bands. Maximum allowable flexible duct length is four (4) feet.
- 3.7 Diffusers, Grilles, Registers:
 - A. Diffusers, registers and grilles to be hung independently of the ductwork and hung ceiling.
 - B. All diffusers and grilles on cooling system must have blanket insulation taped and sealed on top above ceiling to prevent condensation.
- 3.8 Louvers & Ventilators: Use of gravity dampers is discouraged; motor operated dampers furnished and installed by controls contractor is preferred. However, avoid redundancy; i.e. if an air handling unit has a motor operated outdoor air intake and relief dampers, additional dampers are not required at the louver or ventilator
- 3.9 Insulation:
 - A. All supply and return air ductwork is to be insulated and include vapor barrier. Heating only ductwork exposed in finished spaces (i.e. Gym) shall not be insulated. Cooling ductwork exposed in finished spaces shall be insulated with 1" duct liner.
 - B. Exhaust ductwork is not to be insulated unless service is to be utilized by an energy recovery device.
 - C. Insulation on ductwork mounted outdoors shall have EPDM covering applied; tented on top to promote drainage.
- 3.10 Duct Cleaning: Provide duct cleaning requirements in specifications. Cleaning shall be performed if deemed necessary after inspection by the owner, engineer, and/or commissioning authority.

END OF SECTION