

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 WORK INCLUDED

- A. Ductwork and plenums.
- B. Fasteners.
- C. Sealants.
- D. Duct cleaning.

1.2 RELATED WORK

- A. Section 230529 - Hangers and Supports for HVAC Piping and Equipment
- B. Section 230548 - Vibration and Seismic Controls for HVAC Piping and Equipment
- C. Section 230553 - Identification for HVAC Piping and Equipment
- D. Section 230593 - Testing, Adjusting and Balancing for HVAC
- E. Section 233300 - Air Duct Accessories
- F. Section 233600 – Air Terminal Units
- G. Section 233700 - Air Outlets and Inlets

1.3 REFERENCES

- A. NFPA 90A - Installation of Air Conditioning and Ventilating System.
- B. SMACNA - HVAC Duct Construction Standards.

1.4 DEFINITIONS

- A. Duct Sizes: Inside clear dimensions.
- B. Low Pressure: Static pressure in duct less than 2 inch wg and velocities less than 2000 fpm.

1.5 SUBMITTALS

- A. Submit shop drawings, product data, and samples under provisions of Section 013300.
- B. Submit shop drawings and samples of duct fittings, including particulars such as gauge sizes, welds, and configurations prior to start of work.
- C. Confirm ductwork has been fabricated and installed in accordance with recommendations and SMACNA standards and conforms to NFPA and BOCA requirements.

- D. At project closeout, submit record drawings of installed ductwork and products, along with data on volume control devices, fire dampers, connectors, sealants and maintenance information.

PART 2 PRODUCTS

2.1 MATERIALS.

- A. Air Conditioning and General Exhaust Ducts: Galvanized steel, lock-forming quality, having zinc coating of 1/25 ounces per square foot for each side, conforming to ASTM 527 and ASTM 525.
- B. Fasteners: Use rivets and bolts throughout; sheet metal screws accepted on low pressure ducts.
- C. Sealant: Water resistant, fire resistive, compatible with mating materials.

2.2 FABRICATION

- A. Fabricate in accordance with SMACNA duct manuals and ASHRAE handbooks.
- B. Construct ductwork to NFPA 90A.
- C. Size round ducts installed in place of rectangular ducts from ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sized permitted except by written permission.
- D. Complete metal ducts within themselves with no single partition between duct. Where width of duct exceeds 18 inches, cross brace for rigidity. Open corners are not acceptable.
- E. Lap metal ducts in direction of air flow. Hammer down edges and slips to leave smooth duct interior. Seams in grease exhaust duct shall be continuously welded.
- F. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on center line. Where not possible and where rectangular elbows used, provide air foil type turning vanes except in grease exhaust duct.
- G. Increase duct sized gradually, not exceeding 15 degrees divergence wherever possible. Maximum divergence upstream of equipment to be 30 degrees and 30 degrees convergence downstream.
- H. Rigidly construct metal ducts with joints mechanically tight, substantially airtight, braces and stiffened so as not to breathe, rattle, vibrate, or sag. Caulk all duct joints and connections with sealant as ducts are being assembled. Sealant shall be Hardcast or approved equal.
- I. Provide easements where low pressure ductwork conflicts with piping and structure where easements exceed 10 percent duct area, split into two ducts maintaining original area.

2.3 LOW PRESSURE DUCT GAGES - GALVANIZED STEEL

- A. Rectangular Ducts:

Maximum Width

Minimum

In Inches

USS Gage

Up to 12	26
13 to 30	24
31 to 54	22

B. Round Ducts:

Duct Diameter <u>In Inches</u>	Minimum <u>USS Gage</u>
Up to 13	26
14 to 22	24
23 to 36	22
37 to 50	20
51 to 60	18
61 to 84	16

2.4 DUCT GAGES

- A. Contractor shall provide minimum USS gage ductwork indicated above where this gage is heavier than the minimum required by SMACNA.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring. Coordinate with balancing contractor, control contractor and all other trades for locations and quantities.
- B. Clean new duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes. During construction phasing, provide temporary closure over open end ducts which shall prevent entrance of dust and debris until time connections are to be completed.
- C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- D. Connect diffusers or troffer boots to ducts with galvanized steel collars.
- E. At each point where ducts pass through partitions, seal joints around duct with non-combustible material. Provide galvanized steel sleeves through structural walls and at fire dampers.
- F. Routing: Locate ductwork runs, except as otherwise noted, vertically and horizontally and avoid diagonal runs. Locate runs as indicated in plans, sections, and details on drawings. If not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment.

- G. Where ducts pass through partitions and walls and are exposed to view, close spaces between construction opening and duct or duct insulation with sheetmetal flanges of same gauge as duct. Overlap opening on four sides or diameter by at least 1-1/2". Fasten to duct and substrate.
- H. Coordinate ductwork installation with all other trades and with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- I. Where ductwork is to be insulated, assure duct mounted devices have extended necks, operators, etc. to allow complete and continuous insulation of ductwork and maintain insulation vapor barrier continuity.
- J. Medium pressure ductwork and outdoor ductwork shall be leak-tested in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

3.2 SCHEDULE OF DUCT CONSTRUCTION

<u>SERVICE</u>	<u>CONSTRUCTION</u>	<u>SEAL CLASS</u>
Supply Air	Low Pressure, 2"	A
Return and General Exhaust	Low Pressure, 2"	A

END OF SECTION 233100