TABLE 6. APPROXIMATE CONVEYING VELOCITIES

MATERIAL CONVEYED	DESIGN VELOCITY FPM
Vapors, gases, fumes, very fine dust	2,000
Fine dry dusts	3,000
Average industrial dusts	3,500
Coarse particles	3,500–4,500
Large particles, heavy loads, moist materials	4,500 and over

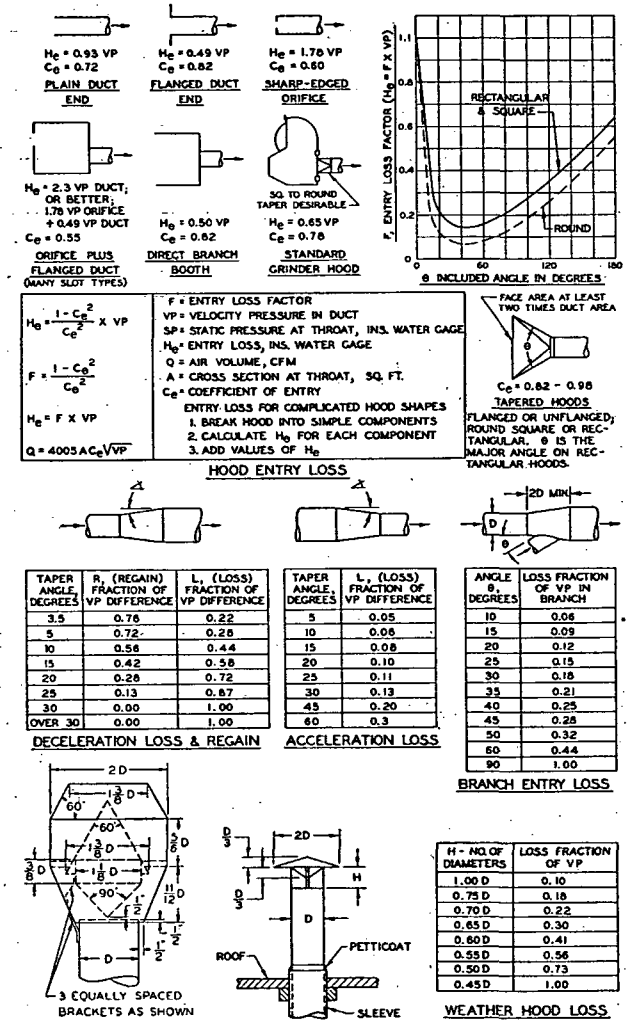

FIG. 2. EXHAUST SYSTEM DESIGN DATA[13]

Tapered hood data from Reference 37
Weather hood data from Reference 38

EXHAUST SYSTEM CONSTRUCTION SPECIFICATIONS AND DESIGN DETAILS[13]

Correct design and competent installation of sheet steel ducts and hoods are necessary for the proper functioning of any exhaust system. The following specifications are mainly those recommended in the manual Industrial Ventilation.[13]

General Requirements

All exhaust systems shall be constructed with the materials recommended herewith and shall be installed in a permanent and workmanlike manner. The interior of all ducts shall be smooth and free from obstructions; with joints either welded, flanged, or soldered air-tight.

Materials

a. Ducts shall be constructed of black iron welded or of galvanized sheet steel riveted and soldered unless the presence of corrosive gases, vapors and mists makes use of such material impracticable. Galvanized construction is not recommended for temperatures exceeding 400 F. Welding of black iron of 18 gage and lighter is not recommended for field fabrication.

b. For average exhaust systems on non-corrosive applications the metal thickness in the following table shall be supplied.

DIAMETER OF STRAIGHT DUCTS (INCHES)	U. S. STANDARD GAUGE FOR STEEL DUCT		
	Class I	Class II	Class III
Up to 8	24	22	20
Over 8 to 18	22	20	18
Over 18 to 30	20	18	16
Over 30	18	16	14

Class I. Includes ducts non-abrasive applications such as for paint spray, woodworking, pharmaceutical, and food products.

Class II. Includes ducts for non-abrasive material in high concentration (low pressure pneumatic conveying); moderately abrasive material; and highly abrasive materials in light concentrations. Typical examples are chemicals and wood dust; exhaust of foundry shakeouts and sand handling systems, grain dusts; coal crushing and screening; exhaust of grit blast cabinets; and grinding, buffing and polishing.

Class III. Includes ducts for conveying all highly abrasive materials in moderate to heavy concentrations and moderately abrasive materials in heavy concentrations as in: low pressure conveying of tobacco; and exhaust systems from abrasive cleaning operations, rock and ore screening and crushing, dryers and kilns, and flyash from boiler stacks.

Where aluminum duct is indicated, the following equivalent B & S gage thickness of sheets should be used:

Steel—U. S. Standard Gage	26	24	22	20	18
Aluminum—B & S Gage	24	22	20	18	16

c. Elbows and angles shall be a minimum of two gages heavier than straight lengths of equal diameter.

d. Hoods shall be a minimum of two gages heavier than straight section of connecting branches.

e. Where flexible piping is necessary, a non collapsible type of flexible piping shall be used and its length shall be kept at a minimum.

Construction

a. Longitudinal joints of ducts shall be lapped, and riveted or spot-welded on 3-in. centers, maximum.

b. Girth joints of ducts unless flanged or butt welded shall be made with lap in direction of air flow with not less than 1-in. lap.