TABLE 8. 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

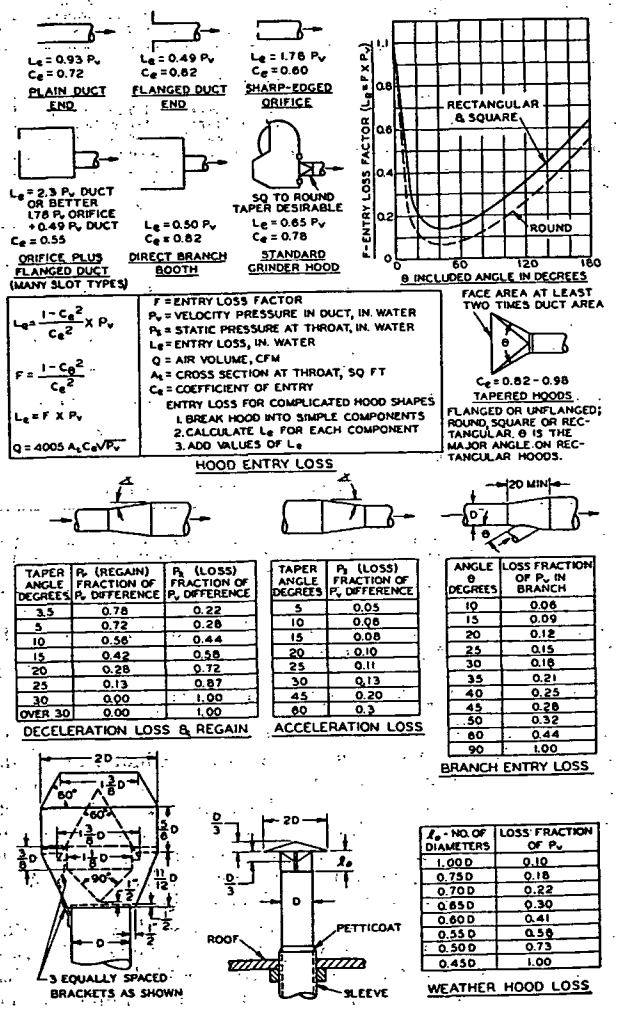

FIG. 2. EXHAUST SYSTEM DESIGN DATA[15]

Tapered hood data from Reference 43
Weather hood data from Reference 44

1-in. steps through 16-in. diameter or larger, and 2-in. diameter steps for large diameters. For contaminants other than solids, conveying velocities are based on a consideration of the higher resistance and lower first cost of smaller diameter ducts against higher first cost and lower resistance of larger diameter ducts.

Main ducts connecting two or more branches are sized by the same procedure as for branches. The main should be designed for the total exhaust volume to be handled through all branch ducts.

Where exhaust systems handling solids are to provide for a substantial increase of future capacity, required conveying velocities can be maintained by:

1. Providing open end stub branches in main through which air will be admitted into system until future connection is made. The volume admitted into the main can be adjusted to required air flow rate, cfm, by use of a blast gate or orifice plate in such stub branch.

2. Arranging system layout so future points can be picked up by a separate main which will run directly to the fan or air cleaning equipment inlet.

CALCULATION OF SYSTEM PRESSURE LOSS

The pressure loss of the system includes entrance loss[42] as air is accelerated through the hood to a branch duct connection, resistance loss of ducts,[44] elbows, and junctions, and acceleration or deceleration losses from velocity changes within the system. Chapter 31 includes data on duct resistance and on resistance of elbows, and provides sample calculations. In exhaust systems, either the equal friction method (illustrated in Chapter 31) or the use of blast gates in the branches to equalize pressure loss of all runs is employed.[8, 11, 16, 19]

Data on losses for hood entrance and branch entry, transitions and weather hoods are given in Fig. 2. The static pressure in branch ducts close to the hood connection is frequently referred to as *hood suction*. It is the sum of the velocity pressure in the branch and the hood entrance loss.

CONSTRUCTION SPECIFICATIONS FOR LOCAL EXHAUST SYSTEMS

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 those recommended in the Industrial Ventilation Manual.[15]

General

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

1. 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 or other conditions make 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.