

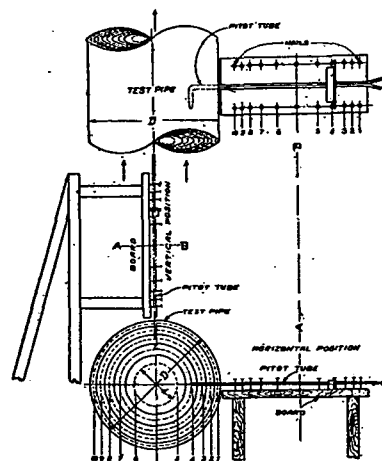


FIG. 68. CONVENIENT METHOD OF CLAMPING PITOT TUBE FOR TEST

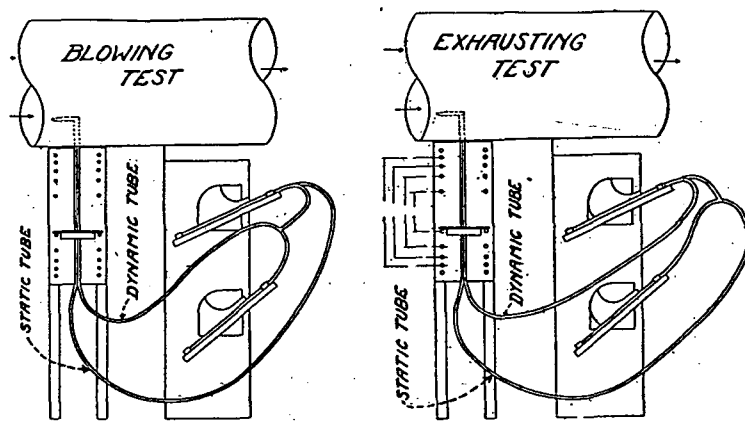


FIG. 69. METHOD OF CONNECTING APPARATUS WHERE STATIC PRESSURE IN DUCT IS BELOW ATMOSPHERE

For moist air:

$$W = \frac{0.0028862B - 0.001088e}{1 + 0.0021758T}$$

where

B = height of barometer in inches of mercury.

T = temperature in deg. Fahr.

e = vapor pressure.

(Source—W. H. Carrier.)

Where approximate results only are desired:

For circular pipe, multiply the velocity pressure taken at the center of the pipe by 0.81 or the velocity by 0.91.

For rectangular pipe, no definite factor can be given, which is even approximately correct, that will cover the varying proportions of width to height of the cross sectional area of rectangular ducts.

The Committee recommends the Pitot tube as a simple and convenient instrument for the measurement of air or gases, which, when used with the proper care and accuracy of reading, gives results with an error of less than 1½ per cent with velocity pressure ranging from 0.1 in. upwards.

DIRECTIONS FOR FIELD TESTS WITH THE PITOT TUBE

For the information of those who are not familiar with the use of the Pitot tube, the following explanation is appended by the Guide Publication Committee.

In determining the velocity and pressures of air in ducts by the use of a Pitot Tube, a hole must be punched in the duct preferably at least 10 diameters of the duct from the fan inlet or outlet or from an elbow or change in cross section of the duct. For ordinary determinations, this hole should be made at the center of the top or bottom of the duct and made just large enough to admit the Pitot tube. Where great accuracy is desired or where it is necessary to make readings close to the fan outlet or to elbows, both horizontal and vertical readings should be made.

In order to make readings at the points in the duct indicated in Table 106, in the above report, it will be found convenient to clamp the Pitot tube in a block as indicated in Fig. 68 and construct a board with nails or pegs inserted so as to hold the tube at the desired points.

For measuring pressures exceeding 1 in., the ordinary manometer is sufficiently accurate. However, in ventilation systems, where the velocity pressure is usually below 1 in. the inclined manometer containing gasoline, usually colored for convenience in reading, will be found most convenient and accurate. Inclined manometers can be obtained with either a fixed inclination or constructed so that various inclinations for different ranges of pressure may be obtained. The latter will be found more convenient and accurate for general field use as they are so constructed that they may be mounted on a tripod or on any vertical or horizontal support.

Having mounted the Pitot tube and manometers as indicated in Fig. 69, it is usually the practice to connect them by means of rubber tubing, special care being taken to have air-tight connections. This can be tested by blowing into the tube and then closing the openings in the tube with the fingers and observing any drop in the manometer. If a noticeable drop occurs, it indicates loose connections.

When a static pressure above atmospheric exists in the duct, the manometers and Pitot tube should be connected as shown in diagram for blowing tests. The upper manometer which is connected both to the dynamic and static tubes will record the difference or velocity pressure, while the lower manometer which is connected only to the dynamic tube, will record the dynamic pressure. Both of these readings will