PAUL-GOTHE-GmbH Bochum

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Manual for Cylindrical-Pitot Tube

The Pitot-Tube

By Pitot Tubes you have always two pressure tubes. One against the gas flow, which measure the total pressure (sum of dynamic and static pressure) and one to measure the static pressure. The difference between these pressures (dynamic pressure) can use to calculate the gas velocity. This dynamic pressures are depends of the density, temperature and atmospheric pressure. If you know the density, you can calculate the gas velocity by measure of the difference pressure.

So that the gas velocity can be measured right, certain conditions must be kept:

- The static pressure cannot correct detected with the cylindrical probe. Flows with vortex and in small ducts (distance measuring point to the wall < 50 mm) influence the accuracy of the measurement. A suitable inlet and outlet section must be at the measuring position.

- The probe must be against the gas flow (< 10° angel to the gas stream).

- If you use the cylindrical-Pitot tube, you must use the corresponding correction factor. According to literature, this value is constant. For measurements below 5 m/s, with a desired accuracy below 10%, we recommend to determine the corresponding correction factor separately.

- The density of the gas must be calculated correctly. The temperature, humidity and pressure in the channel have a strong influence on the density. The atmospheric air pressure at the measuring point has less influence, but it must always be taken into account. Please note that measuring point air pressure gauge and measuring point channel should be at a height. For correction, the rule of thumb is 0.1 kPa to 8 m difference in height.

Cylindrical Pitot Tube

Factor ~ 0,79 .. 0,83 (see calibration certificate)

Lateral hole against the gas flow.

Formula to calculate the gas velocity:

$$v = K \bullet \sqrt{\frac{200 \bullet \Delta p}{\delta}}$$

with p: difference pressure in mbar,
δ: operating density of the gas
K: Correction factor

total pressure (+)

stat. pressure (-)