

Different Between Pitot Tube, Hot Wire & Vane Anemometer

A. Pitot Tube anemometers

Pitot tube anemometers measure air flow in high pressure condition and use this to calculate air velocity. A Pitot tube is used for purpose to measure the total pressure of incoming air, and the static tube is used to measure the static pressure in the air flow. The meter then calculates the air velocity using the Bernoulli equation.

Pros

- Can handle very high air velocity and temperature
- Pitot tubes can be quite small and are easy to insert into duct work.
- No moving parts
- Quick response

Cons

- Not suited to very low air velocity
- Not well suited to fluctuating flow
- Must be pointed at direction of air flow

B. Hot wire anemometers

Hot wire anemometers work by heating up a fine wire above ambient temperatures and then measuring how much current is required to keep it at a constant temperature, or measuring how much the temperature changes under constant current. The heat loss is then converted into an air velocity reading.

Pros

- Low starting threshold
- Small sensor size
- No moving parts
- High accuracy and quick response

Cons

- Not suited to areas with rapidly fluctuating temperature
- Large particles in the air can damage the sensor

C. Vane Anemometers

Vane anemometers work in a similar way to cup anemometers but the sensors are shaped like a windmill or turbine. Vane anemometers must be pointed towards the wind to read accurately. They are popular for HVAC applications.

Pros

- Can handle dirtier environments and more rugged than hot wire anemometers
- Can handle higher velocities than hot wire anemometers

Cons

- Must be pointed towards source for accurate readings
- Smaller vanes can have a high starting velocity
- Moving parts will wear out over time