Testing and Commissioning Association Inc.

AIR FLOW & MEASUREMENT

Air flow measurement is achieved by the measuring the air speed or velocity (m/s) and multiplying this by the area (m^2) of the duct that contains the flow of air. Air flow, or volume flow rate, is typically expressed as litres per second (l/s) in Australia.

The following formula can be used to calculate air flow:
$m/s \times m^2 = m^3/s$

To convert this to l/s, multiply by 1000
$m^3/s \times 1000 = l/s$

Typical Air Velocity Instruments

- Pitot tube and Micro Manometer
- Anemometer - Rotating Vane or Hot Wire

Typical Air Volume Instruments

- Capture Hood and Micro manometer
- Capture Hood and Anemometer

Tips for Accurate Readings

Air flow is most accurately measured when the air pattern (velocity profile) is uniform.

For ducts, this should be performed in a section with at least 5 diameters of straight upstream and 2 diameters of straight down stream.

Capture hoods require the use of dividers when measuring swirl outlets to 'straighten' the air pattern.

https:www.taca.org.au/technical

FANS & SYSTEM RESISTANCE

Fans move air flow (l/s) against system resistance. The resistance of a system is measured in Pascals (Pa). The total system resistance or pressure which the fan has to overcome is the sum of the pressure on the outlet and the inlet. This is made up of duct (straight, bends and transitions), filters, coils, outlets & dampers.

Poor mechanical design, installation or maintenance practices result in excess system resistance that affect total fan performance.

Some common issues are:

- Restrictive flex duct installation
- Square bends without turning vanes
- Fouled filters