



THE IMPORTANCE OF PROPER VENTILATION AND AIR BALANCING



INTRODUCTION

People don't often stop to think about the quality of the air around them. Just like walking, talking and breathing, it's a factor of life that's taken for granted.

That is unless you're a heating, ventilation and air conditioning (HVAC) technician. You're then aware of what a difference great indoor air quality (IAQ) can make.

Air balancing and routine maintenance of ventilation equipment play pivotal roles in preserving IAQ and creating a comfortable, healthy atmosphere for inhabitants. In a commercial setting, productivity and general wellness can suffer as a direct result of poor practices.

Through gaining an understanding of their pivotal importance, and the potential impact of disregarding proper ventilation and air balancing, service engineers can better understand the value of highly accurate instruments.

AIR BALANCING AND IAQ:

What you need to know



Commercial buildings are most often closed environments, and every action has a corresponding reaction. Take sunlight for example, which can skew temperatures in certain areas - especially if staff can't open the windows.

Depending on where an office is located in Australia, it's likely that north-facing rooms would take in more heat than south, east or west. In a conventional HVAC system, air flow to every area would be equal. But the cooling power would be too weak to create a comfortable setting for rooms facing north, and perhaps too strong for those in the south.

Air balancing counters this by dispersing the cooling load according to specific need. By testing and measuring air flow with an air velocity instrument, technicians gain valuable data that can be analysed to adjust equipment appropriately, creating an equilibrium that suits the needs of every individual room. The process must also take into account alternative sources of heat, such as computer towers or other machinery.

IAQ is a direct result of ventilation practices - whether for better or worse. A number of factors combine to provide either a comfortable environment for occupants, or one that could be potentially hazardous to their health:

- Temperature;
- Humidity;
- Carbon monoxide (CO);
- Volatile organic compounds (VOC);
- Absolute pressure.

While air balancing is designed to improve general comfort, regular IAQ testing is employed to root out a variety of disturbances that could cause occupants to feel drowsy, reduction in productivity or even be susceptible to CO poisoning.



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TECHNICIANS MUST RISE TO THE OCCASION



Australian HVAC technicians must ensure a commercial building's ventilation system meets the minimum requirements set by the Australian/New Zealand Standard (AS/NZS) 1668.1:2015. This includes:

- 7.5 metres per second of filtered air per occupant, or;
- 10 litres of unfiltered air per person.

Regarding pollutants, specifically CO, National Environment Protection Council [NEPC] set maximum [ambient] CO concentration level at 9.0 ppm [averaging period – 8 hours & not to exceed 1 day per year]

Beyond the stipulations, there is no consensus on universal standards [or even guidelines] to measured amount of a particular IAQ parameter [because people simply have different tolerance levels to different substances]. But that doesn't mean service engineers shouldn't strive to develop an environment conducive to high levels of productivity. Failure to do so can leave staff vulnerable to general fatigue. This can lead to a workforce unable to put in a full eight-hour day of productive work, and could lead to medical complications further down the line.

When it comes to using multifunction instruments to gather data about air flow and IAQ, no two devices are the same.

A varying technology and uncertainty in air flow measurements can provide vastly different figures and lead to skewed results. There's potential danger in not being able to meet the following general recommended ranges [perceived as "comfortable"] of IAQ parameters:

- **Temperature:** 22 to 24 degrees Celsius.
- **Humidity:** 50 to 70 per cent.
- **Carbon dioxide (CO₂):** Cannot exceed 500 to 600 parts per million (ppm).
- **Absolute pressure:** Balanced is ideal; better to be overpressured than underpressured.
- **CO:** Zero Tolerance.

Failure to maintain those guidelines - or gather accurate measurements - can spawn a number of concerns:

- Variations in temperature can lead to a frigid climate or sweltering heat.
- A lack of humidity can cause skin irritation, and too much could bring on fatigue or fainting spells.
- Exceeding 40,000-80,000 CO₂ ppm can cause convulsions, rapid loss of consciousness, and 200,000 ppm is fatal in few seconds.
- Negative absolute pressure supports condensation and can spawn mould, which damages respiratory systems if left unchecked.
- Carbon monoxide is a silent killer and a source of numerous physiological symptoms, such as nausea and blurred vision.

With so much at stake, HVAC technicians can't afford to be wrong. This puts the tools they use on a daily basis on a pedestal.

MAKING THE RIGHT CHOICE



When it comes to air balancing or testing IAQ, there are some devices that stand head and shoulders above the rest due to the state-of-the-art technology.

The testo 420 air flow hood is a great example; when used correctly, it leverages a proprietary air flow straightener to significantly improve measurement accuracy, resolution and stability of measured data. Its practicality lies in the balancing the system, while also conveniently being able to gather metrics like temperature, humidity, absolute pressure and flow velocity all at once. Information can be stored and accessed on the control unit and through the accompanying testo 420 mobile app and via PC.

Measuring IAQ should be simple enough that it can be done regularly to identify problems before they have a chance to evolve. This relies on a multifunction instrument like the testo 440, which can seamlessly and accurately collect data on a multitude of different parameters.

These tools are helping HVAC technicians make better decisions on proper ventilation and IAQ practice.

Because of this, organisations are benefiting from greater workforce productivity and comfort. Find out how we can help you improve your testing methods and increase your efficiency by contacting Testo today.



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