

The 7 Steps To Assessing CO₂ Ventilation Retrofits

This guide highlights the steps that can be used in assessing a building for CO₂ based ventilation control. This guide is written for building owners or contractor to economically assess and justify whether an existing building or space is a good candidate for CO₂ based ventilation control. Links to more detailed information is provide in the References section at the end of the guide. These two pages link you with everything you need to know about CO₂ ventilation control and energy savings!

1. **Spot Check:** Use the AirTest PT9250 hand held CO₂ monitor to take spot CO₂ measurement in major occupied spaces of the target building. Note location, CO₂ levels, cfm/person ventilation rate displayed on the PT9250 and the number of people in the space. You can quickly qualify the building for potential energy savings using the following criteria:

Ventilation Rate Display (cfm/Person)	CO ₂ Level (ppm)	Interpretation
> 20	900 - 400	Over Ventilated: Space is over ventilated for the current occupancy and opportunities for significant energy savings may exist using CO ₂ control.
15 - 20	1100 - 900	Acceptable Ventilation: Outside air entering the space is at or near design. Energy savings form CO ₂ control will be directly related to the degree of variable or intermittent occupancy.
< 15	1100 +	Under Ventilated: Space is under ventilated compared to current ventilation stadards. CO ₂ control will reduce cost of conforming to standards & can improve working environment by enhancing comfort, reducing illness & increasing productivity.

2. **Document Ventilation Rates:** To confirm and document ventilation rates, record CO₂ concentrations over a typical day or week. Use peak concentrations to determine ventilation rate. Note occupancy at peak periods and use to calculate total ventilation:

$$\text{Total Ventilation} = \text{cfm/person (measured with CO}_2\text{)} \times \text{Occupancy}$$

3. **Energy Analysis:** Use the AirTest "CO₂ Ventilation & Energy Analysis Program*" to calculate potential energy savings from controlling ventilation using CO₂ based ventilation control. Use the information collected in Steps 1 & 2 to compare ventilation at the current fixed rate versus modulating ventilation based on occupancy using CO₂ control. If a number of different spaces are involved, do one analysis for each space and add them up.

* The program including local climate data is free with every PT9250 purchased until Nov 2003 (\$300 value).

4. **Installation Assessment:** Assess costs and details of monitoring CO₂ in every major occupied space using maintenance free AirTest CO₂ monitors to modulate outdoor air delivery. For multiple story buildings outside air rates should be modulated at least on every floor with the air delivery controlled by the highest zone CO₂ level measured on each floor (usually 4-6 sensors are used per floor).

5. **Payback & ROI Analysis:** Use the payback and Return On Investment analysis features in the AirTest CO₂ Ventilation & Energy Analysis Program to compare project cost to potential return for the customer. In many projects, additional building upgrades may be able to be cost effectively included in the project such as VFD's, upgrading the building control system and/or efficiency & equipment upgrades. Utility rebates may also be available.

AirTest also offers sensor technology for temperature, humidity, parking garages, air velocity measurement and other gases that will further enhance building operation and energy savings.

6. **Post Installation Assessment:** Often the energy savings resulting from an actual installation is much greater than estimated (the AirTest program is intentionally conservative in its assumptions). If possible have monthly energy use data available for one year prior to the installation and use this data to compare to results to the energy use with CO₂ based ventilation control. A clear trend of energy savings should be apparent after 3 months.

7. **Leverage Your Success:** Use the results of your initial projects to sell future projects. Virtually every existing building is a candidate for CO₂ based ventilation control. A well-documented project can be a great tool to leverage future sales. AirTest will even work with you in developing a multi-media case study for your project that you can use as a sales tool. Example case studies are provided in the Reference section of this guide.

References: (Click on link or insert web address in your browser to download these documents)

Using The AirTest PT9250 Hand Held CO₂ Monitor For Building Assessment

- PT9250 Datasheet: <http://www.airtest.ca/docs/co2/pt9250.pdf>
- Application Guide For Hand Held Measurements (12 page): <http://www.airtest.ca/docs/article/pt9250guide.pdf>

The AirTest CO₂ Ventilation Control & Energy Analysis Program

- Download a sample program: <http://www.airtest.ca/docs/ea/easample.zip>
- Program manual: <http://www.airtest.ca/docs/sw/sw2000man.pdf>

CO₂ Ventilation Control Reference Articles & Application Guides

- Description and links to a number of articles and application notes on use of CO₂ for ventilation control: <http://www.airtest.ca/docs/article/co2reference.pdf>

AirTest Case Studies

AirTest case studies are one-page project summaries that include photos and links to video testimonials to owners or contractors involved in the project talking about real CO₂ retrofit results. Call AirTest if you would like a case study developed for one of your CO₂ retrofit projects at no cost. It is an ideal marketing tool that can give you a differential advantage in building awareness and you business.

- Seattle School District: <http://www.airtestl.ca/docs/cs/scs1.pdf>
- Coquitlam School District: <http://www.airtest.ca/docs/cs/scs2.pdf>

AirTest Products:

- Length Matters... Why You Should Consider Using AirTest CO₂: http://www.airtest.ca/docs/article/length_matters.pdf
- AirTest TR9220 CO₂ & Temperature Monitor: <http://www.airtest.ca/docs/co2/tr9220.pdf>
- AirTest Lonworks® CO₂ & Temperature Monitor: : <http://www.airtest.ca/docs/co2/tr9020.pdf>
- AirTest “No Frills” CO₂ Monitor (TR9290): <http://www.airtest.ca/docs/co2/tr9290.pdf>
- AirTest Virtual Product Catalog: <http://www.airtest.ca/docs/vacatalog.pdf>

AirTest Training

If you have 5 or more interested individuals, a high speed internet connection, and a PC with a web browser, AirTest can provide you and your people with live-web based training on a variety of topics at no cost. Please arrange at least 1-week prior to target date. Call AirTest to schedule training on any of the following topics or ask us to custom-tailor a presentation to your group's interest:

- “The 7 Steps To Assessing CO₂ Ventilation Retrofits” (30 minutes)
- “CO₂ Control And Retrofit In Buildings, What You Need To Know” (45-60 minutes)
- “CO₂ Control & Energy Savings” (30-60 minutes)
- “CO Ventilation Control In Parking Garages & Energy Savings” (30 min)
- “AirTest Product Application Spotlight” - Available On Any AirTest Product (15-30 minutes).