

BUILDING *performance* LAB

Minimum OAD Position Check

Measure Description

A good operating level of ventilation strikes a good balance between indoor air quality (IAQ) and energy efficiency. Under-ventilation compromises air quality, and over-ventilation wastes energy since it requires more heating or cooling energy of outdoor air than is needed.

For buildings that do not have demand controlled ventilation (DCV), there exists a minimum outdoor air damper (OAD) position that should be set such that the maximum CO₂ concentration for any served zone reaches the maximum level considered sufficient for good indoor air quality; this is typically 900 ppm, but may be set as high as 1,100 ppm. This measure determines whether the minimum OAD position is selected to capture the right balance between healthy IAQ during maximum load occupancy and energy efficiency.

It's worth noting that the minimum OAD position, by design, over ventilates when zones are not at maximum occupant load. Consider adding Demand Controlled Ventilation ([1410.02](#)), which allows you to have a much smaller (if not closed) minimum OAD position when zones are empty or lightly occupied, and will increase ventilation when CO₂ levels rise about the maximum set point. This can save significant energy.

Note: This measure must be done when the air-side economizer is not in use. This typically occurs during the height of heating and cooling seasons, i.e., during extreme temperatures. Otherwise, the additional air that is introduced for free cooling reduces the CO₂ concentration. To avoid this situation, you may choose to override / disable air-side economizing while gathering data.



City College of New York
160 Convent Avenue
Marshak Science Building
Room 118
New York, NY 10031

96 Greenwich Street
4th floor
New York, NY 10006
cunybppl.org

Dr. Robert E. Paaswell
Executive Director, CIUS
Michael Bobker
Associate Director, CIUS
Honey Berk
Executive Director, CUNY BPL

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Kit Contents

Data from the CO2 logger may be acquired either via Bluetooth and the HOBConnect® mobile app or through a wired connection to a PC and the HOBOWare® software program.

- HOBO® CO2 logger: MX1102 – one in the RA duct and/or one per zone where high occupant loads are experienced
- Via Bluetooth
 - Phone or tablet with Bluetooth (e.g. iPad)
 - HOBConnect® mobile app
- Via wired connection
 - PC-based device with USB port (e.g. laptop or Surface Pro)
 - HOBOWare® software
 - Microsoft Excel

HOBO® CO2 logger

1. Configure: <https://youtu.be/pbYrj0FGmaY>
 - a. Best practice: Configure with 15-minute time intervals and “Wrap” recording
2. Calibrate: <https://youtu.be/z5AYbANtHEw>
3. Extract data: <https://youtu.be/blaOMLk8p6U>
4. Use the HOBOWare® software to visualize data



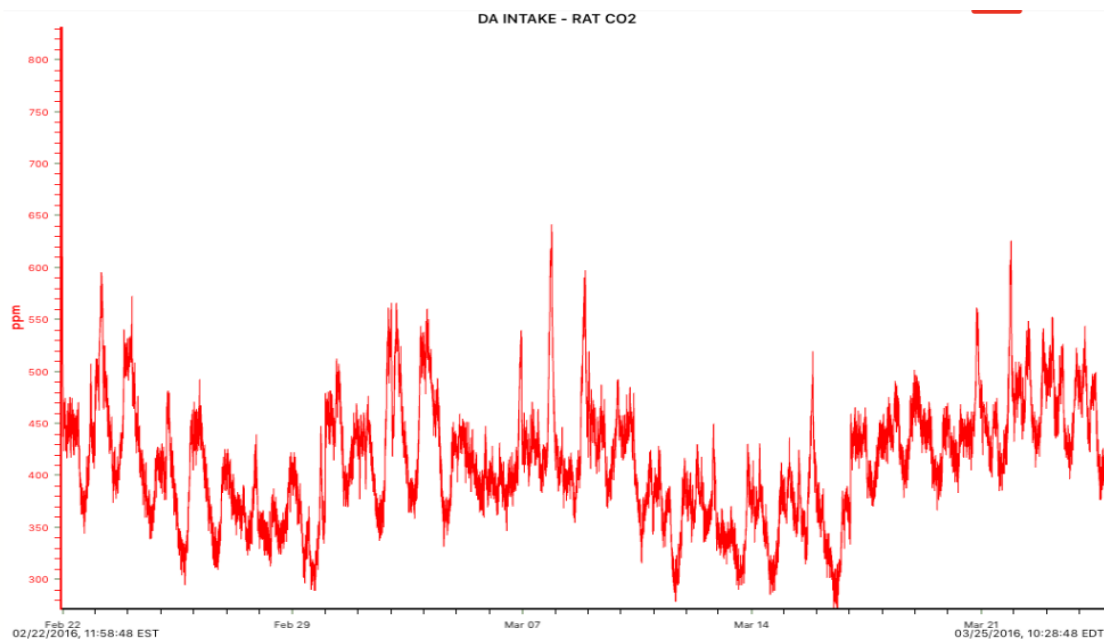
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Trend Chart Example



Analysis

Looking at the trend chart above, use the following Q&A to analyze the data for opportunities for energy savings.

1. Do CO2 levels drop to 420 (+/- 75) ppm when the building is unoccupied?
 - a. If YES, then your logger is properly calibrated and you can move on to the next question.
 - b. If NO, recalibrate the logger and redo the trend chart.
2. Do CO2 levels of densely occupied zones exceed 900 ppm for hours at a time?
 - a. If NO, then you are not under-ventilating. This indicates that the space is always ventilated to maintain a healthy environment, but it's still possible that you are over-ventilating. Continue to the next question.
 - b. If YES, then your minimum OAD position is too small for healthy operation; increase your minimum OAD position by 3% and redo the trend chart. Doing so will require more energy, but the top priority is to create a healthy and comfortable environment for your occupants!
 - i.
3. Are CO2 levels of densely occupied zones always below 750 ppm?
 - a. If NO, then this is a good operation.



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- b. If YES, then you are over-ventilating; have the controls tech reduce your minimum OAD position by 3 to 5% ([1425.38](#)) and redo the trend chart.
 - i.



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