

# FREE Tool for Occupants



70,000+ Individual Scores

Joe Medosch

Healthy Building Scientist



House Type



Occupant Behaviors



Occupant Health Symptoms

Determine if your home is impacting your health!

# IAQ Monitors – for Contractors

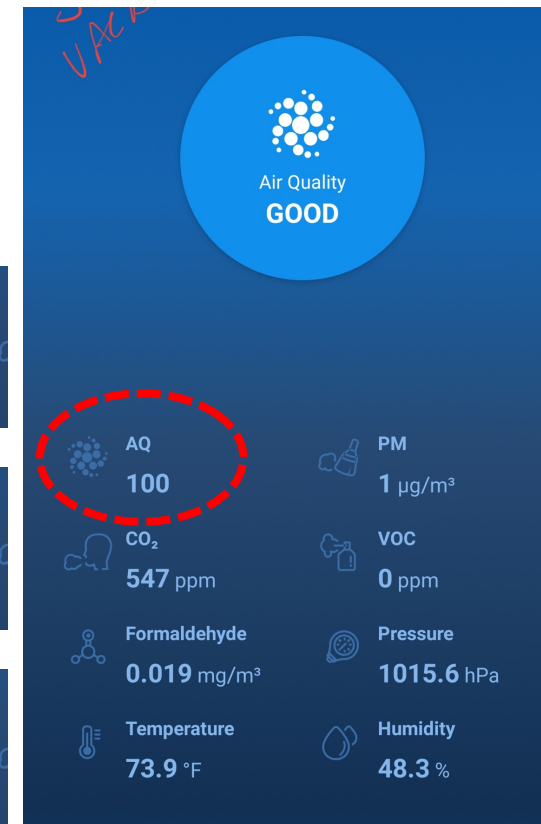
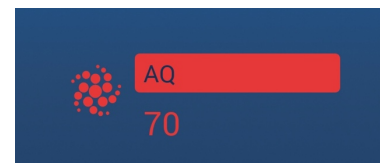
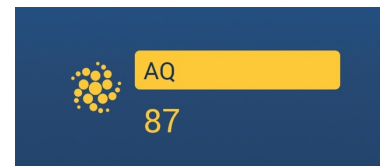
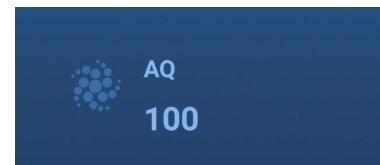
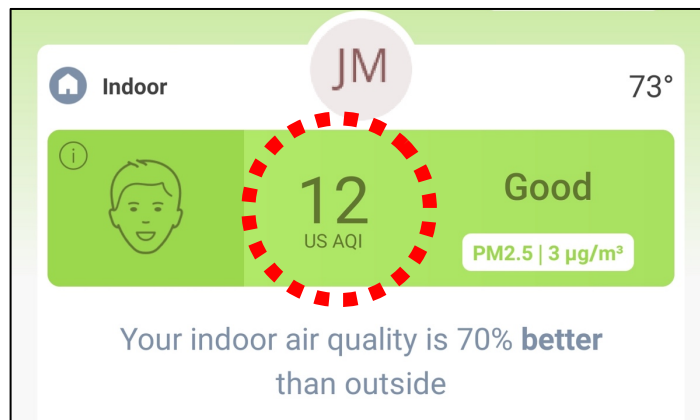
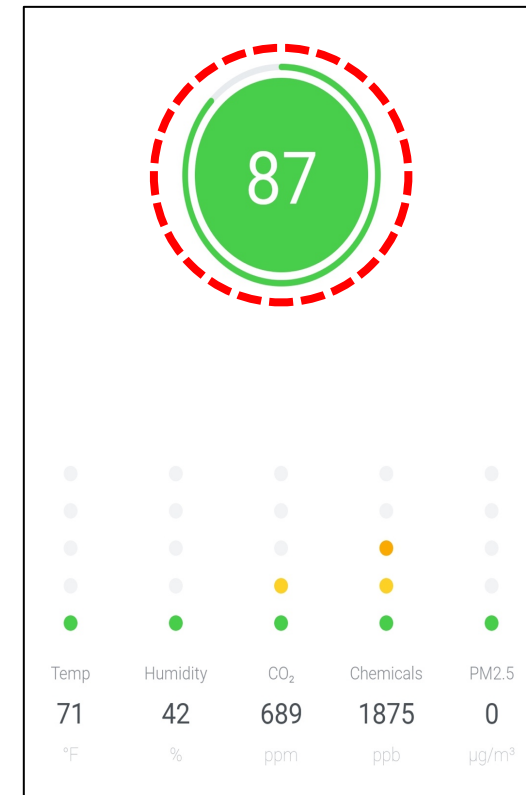
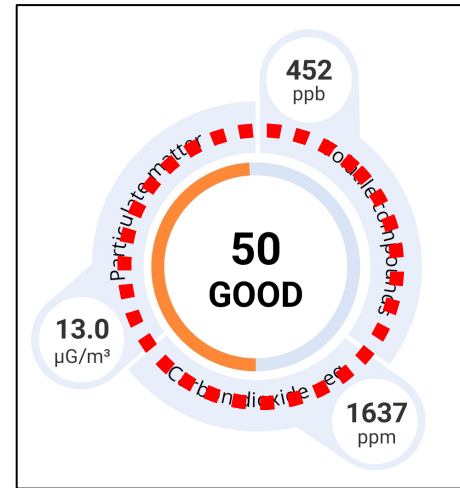
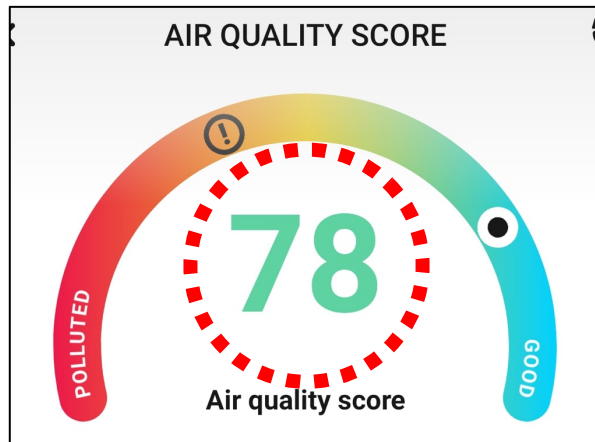
- IAQ monitors can be a business opportunity
- Inherent limitations of monitors
- Where, when and how long to leave the IAQ monitor
- Some of the better monitors for contractors
  - Relatively accurate and reliable sensors
  - Online dashboard and mobile app
  - Or specifically intended for contractors
- Standard for monitors
- What is next for IAQ monitors and improving IAQ

# IAQ Monitors – basic measurements

- Device that measures
  - Temperature
  - RH relative humidity
  - Particulates (PM 1.0, 2.5, and or 10)
  - CO2 carbon dioxide
  - tVOCs (Total Volatile Organic Compounds)

# What is an AQ – Manufacturer's Air Quality

## Index Score Number



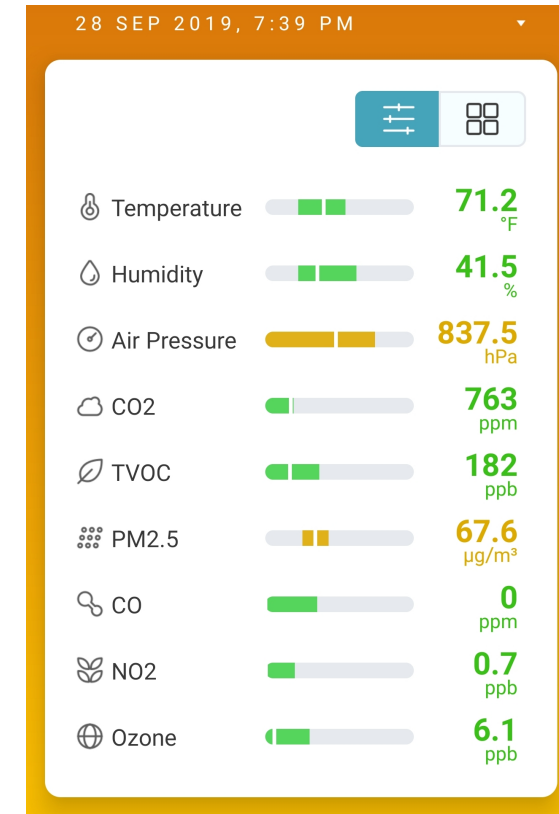
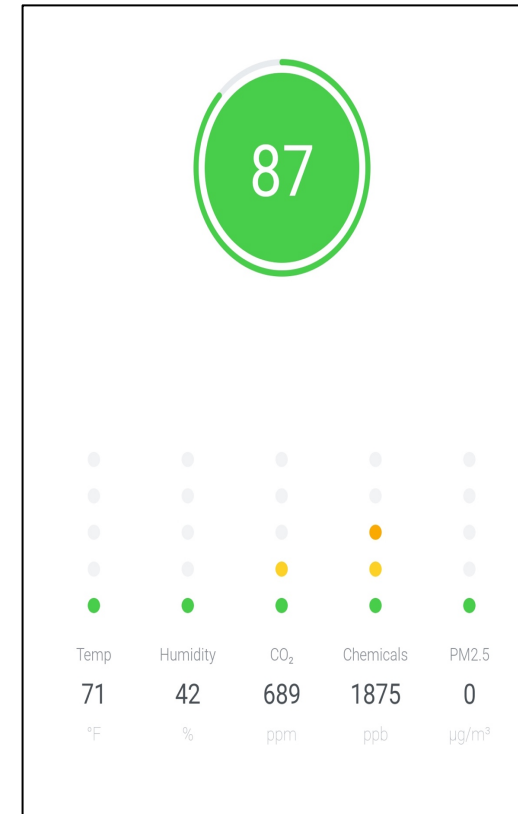


# IAQ Monitors have limited accuracy

## Blood Test Results

Blood Test	Result	Normal Value
WBCs (billion/L)	8.00	3.5 to 10.5
Neutrophils (%)	62	40 to 70
Lymphocytes (%)	28	25 to 45
Monocytes (%)	10	2 to 8
Eosinophils (%)	1	1 to 5
Basophils (%)	0	0 to 1
RBCs (trillion/L)	3.84	4.3 to 5.7
Hb (g/dL)	11.7	13 to 17
Hematocrit (%)	37	37 to 52
Platelets (billion/L)	262	150 to 450

## IAQ Monitor Results



# IAQ Monitors =



# Multiple devices

Bluetooth

WiFi

PM 2.5

4G

Bluetooth

WiFi

4G

Personal

Radon

WiFi



# Multiple devices



Personal



Bluetooth



Bluetooth



Radon



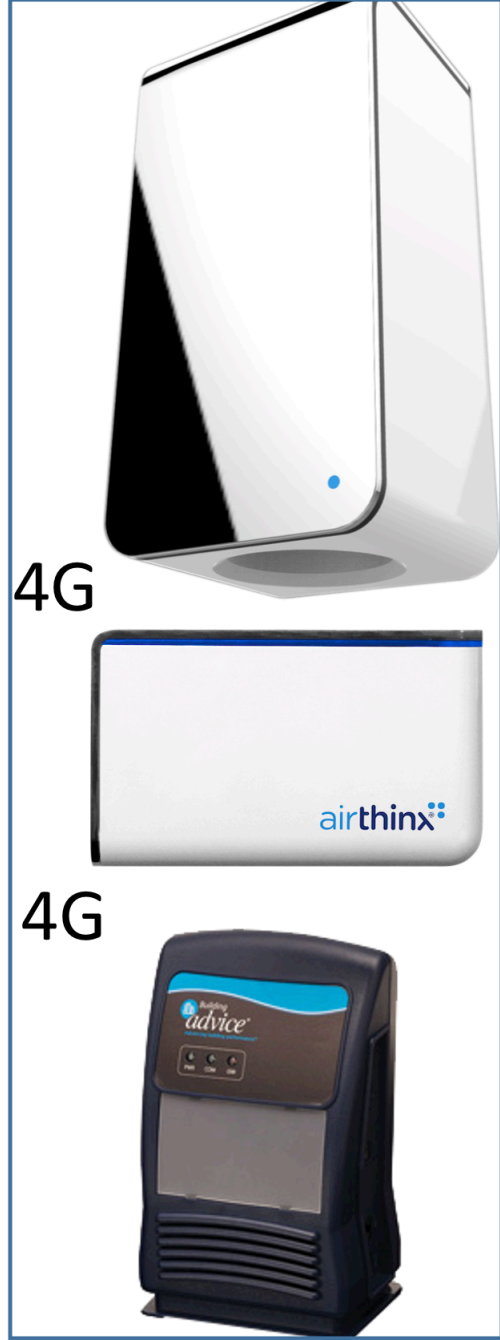
PM 2.5



WiFi

WiFi

WiFi



4G

4G





# IAQ Monitors – endless choices



## Trend Indicators

# IAQ Monitors

at that time

# Trend Indicators

in that location

# What do you want to use the IAQ monitor for?

- Measure what conditions?    General conditions or ???
- Where in the house?    Set a schedule for clients to relocate  
- more than 1 monitor    the monitor and document location / time
- How long is it measuring?    When?    3 work days + weekend min.  
2 weeks +
- How will you get the data or share it?    Send report / share data
- How will you know what occurred in the home?  
- windows open? / cooking / showers    Clients keep a journal?

# Role of the contractor and role of the device

- Do you choose to let the client see the measurements?
  - does a device have a display?
  - is it better to hide this information or let them see it?
- What is the data really mean as actionable items
  - are there thresholds for these readings
- What are these devices telling you?
  - conditions and materials in the home,
  - their habits

If you had a doctor visit that was 3 minutes – do you feel it would be a thorough evaluation?



# Role of the contractor and role of the device

This is the ultimate engagement tool.

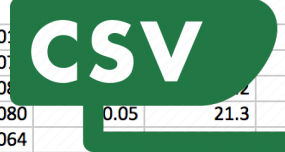
It is useless unless you the contractor  
fully engage the client.

The success of the IAQ monitor is dependent on the  
contractor – more than the device or client.

Share one with technicians and staff.

# Data – what do you get and how?

	A	B	C	E	F
1	Device	AirThinx	AirThinx	AirThinx	AirThinx
2	Timestamp (	Pressure (hPa	CO <sub>2</sub> , (ppm)	CH <sub>4</sub> , (ppm)	Temperature Humidity (%)
3	8/4/19 4:05				
4	8/4/19 4:06				
5	8/4/19 4:06	851.4			52.8
6	8/4/19 4:07	851.5	1080		51.1
7	8/4/19 4:08	851.5	1080		50.3
8	8/4/19 4:09	851.5	1080		59.4
9	8/4/19 4:10	851.5	1080	0.05	58.7
10	8/4/19 4:11	851.5	1064		58
11	8/4/19 4:12				
12	8/4/19 4:12	851.2		0.05	21.6
13	8/4/19 4:13	851.2	1122	0.05	21.7
14	8/4/19 4:14	851.2	1103	0.051	22
15	8/4/19 4:15	851.2	1080	0.052	22.3
16	8/4/19 4:16	851.2	1059	0.052	22.6
17	8/4/19 4:17	851.2	1048	0.052	22.8
18	8/4/19 4:18	851.5		0.052	23
19	8/4/19 4:19	851.5		0.052	23.1
20	8/4/19 4:20	851.5	1052	0.052	23.2
21	8/4/19 4:21	851.5	1054	0.052	23.4
22	8/4/19 4:22	851.5	1054	0.052	23.4
23	8/4/19 4:23	851.5	1067	0.052	23.5
24	8/4/19 4:24	851.5	1069	0.053	23.6
25	8/4/19 4:25	851.5	1055	0.053	23.6
26	8/4/19 4:26	851.5	1048	0.053	23.7
27	8/4/19 4:27	851.5	1060	0.055	23.7



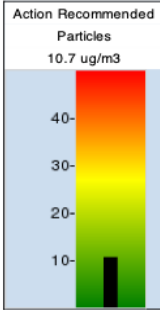
## AirAdvice for Your Home

Test Date: 05/05/2015  
 Monitor: 32151  
 Report ID: 218838

This report displays our findings about the air quality in your home, and offers recommendations to help you make informed decisions about your family's health, comfort and safety. If you have additional questions, please visit [www.airadviceforhomes.com](http://www.airadviceforhomes.com).

### HEALTH

#### Particles



**Health Concerns** Particles are generally a cause for concern when daily average levels are above 10 ug Particles are known to trigger asthma and allergy symptoms. At levels above 35 ug/m<sup>3</sup>, they can harm normal healthy adults by causing emphysema and diminished lung capacity. Children, the elderly, and pregnant women are more susceptible.<sup>a</sup>

**What We Found in Your Home** Particle levels were between 11-35 ug/m<sup>3</sup>.

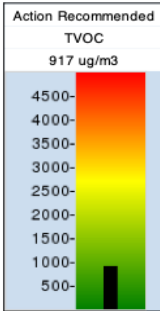
**Potential Causes** Particles can build up to unhealthy levels due to three primary causes:

- Activities in the home
- Presence of excessive particulate sources
- Heating and cooling system issues

#### Recommended Actions

- Replace filters or upgrade filtration system
- Inspect and clean duct work
- Use the exhaust fan during cooking
- Install UV light in cooling coil to prevent mold

#### Chemicals



**Health Concerns** Chemical pollutants are generally a cause for concern when average levels are above 500 ug/m<sup>3</sup> (micrograms per cubic meter of air). Chemical pollutants are known to trigger asthma and allergy symptoms. At moderate levels, eyes and nasal passages can be irritated. Some people can experience nausea and headaches. At very high levels, they can even affect normally healthy adults by overworking the liver and kidneys. Children, the elderly, and pregnant women are more susceptible.<sup>b</sup>

**What We Found in Your Home** Chemical pollutant levels were between 501-3000 ug/m<sup>3</sup>.

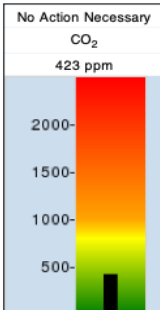
**Potential Causes** Levels can build up in your home's air due to usage of chemical products and heating/cooling system issues:

- Sources: Off-gassing from building materials, carpeting, furniture and other synthetic materials, fuel fumes, scented products and air fresheners, personal care products, household products such as paint, glue, and plastics
- Possible heating & cooling issues: Lack of fresh air introduced into home (either inadequate mechanical ventilation or none present), no chemical pollutant removal equipment

#### Recommended Actions

- Install an energy efficient ventilation device, such as a heat or energy recovery ventilator (ERV or HVR)
- Install a VOC reduction device such as a photocatalytic oxidizer (PCO)
- Minimize use of VOC sources such as air fresheners, open cleaning fluids, or candles

#### Carbon Dioxide



**Health Concerns** Carbon dioxide (CO<sub>2</sub>) levels above 750 ppm (parts per million) are a cause for concern. At higher levels, CO<sub>2</sub> inside a home can contribute to what the EPA terms "sick building syndrome," which leads to fatigue, headache, breathing difficulties, nausea, strained eyes and itchy skin. At even higher levels, CO<sub>2</sub> can cause asphyxiation as it replaces oxygen in the blood. CO<sub>2</sub> poisoning, however, is very rare. The U.S. EPA recommends a maximum concentration of CO<sub>2</sub> of 1000 ppm (0.1%) for continuous exposure.<sup>c</sup>

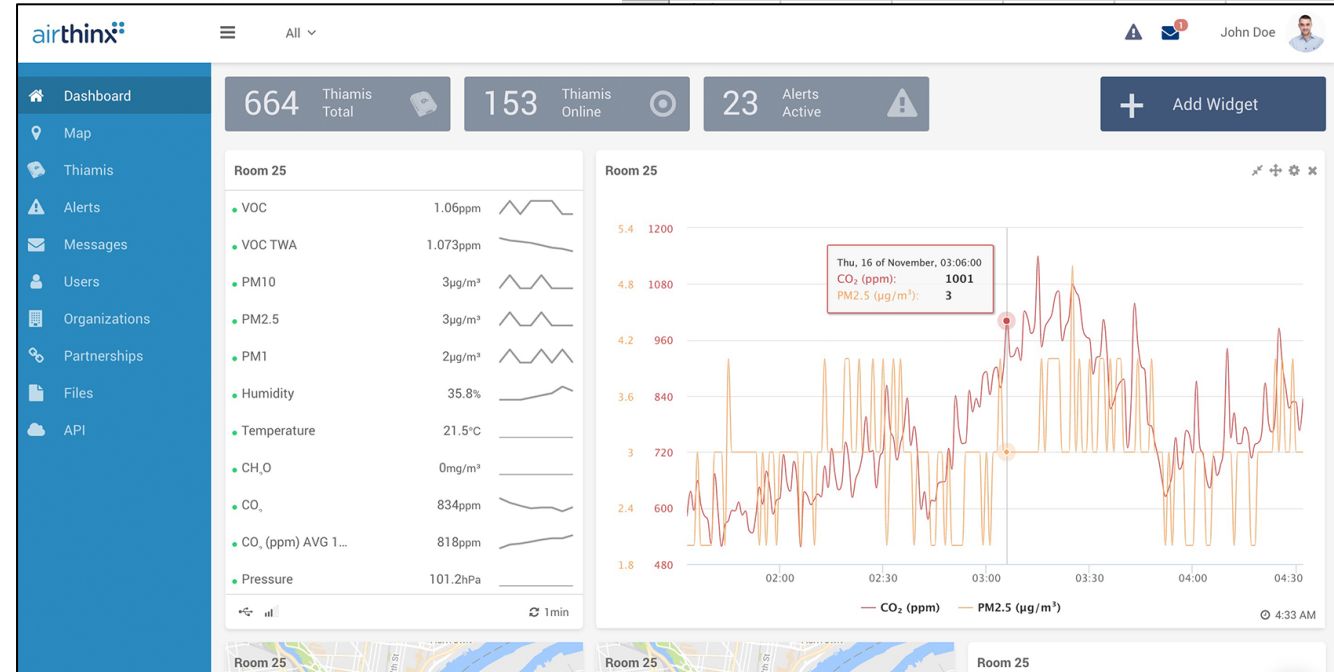
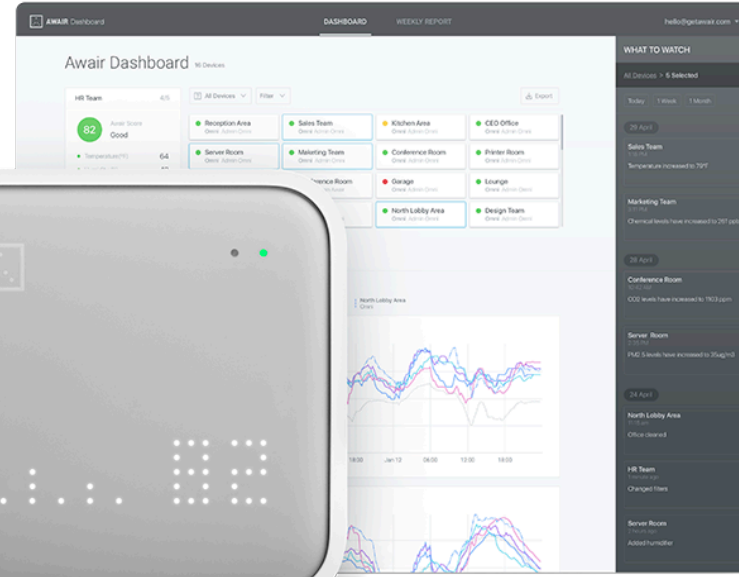
**What We Found in Your Home** Carbon dioxide levels were below 750 ppm.

**Potential Causes** Elevated carbon dioxide levels can occur in the home due to source causes, home heating & cooling system issues, or both:

- Sources: 'Tight' (well weatherized and energy-efficient) home construction without adequate ventilation, common human & household activity (breathing, and burning candles, gas, wood, or other combustion)
- Possible heating & cooling issues: Lack of supplied fresh air (no ventilation), malfunctioning ventilation, ventilation shut off by occupant, HVAC equipment needs repair or service

#### Recommended Actions

- Use the exhaust fan during cooking
- Inspect combustion sources, such as fireplaces, gas heaters, or gas stoves, for proper ventilation



a. Source: American Lung Association, Environmental Protection Agency (EPA); Indoor Air Quality Association.

# IAQ Monitors – Data A, B, Cs

- The device measures the data...
- Where is it stored?
  - On the device
  - In the cloud
  - Do you own the data if you terminate the contract?
- Who has access to the data – Manufacturer?
  - GEO location

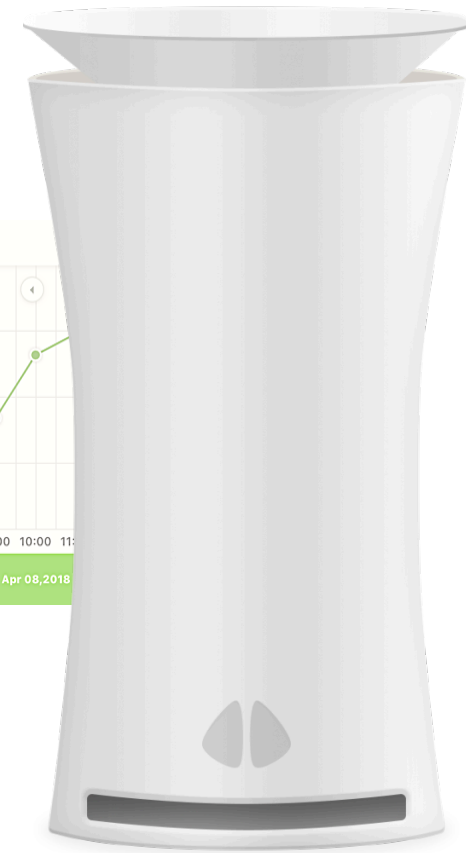
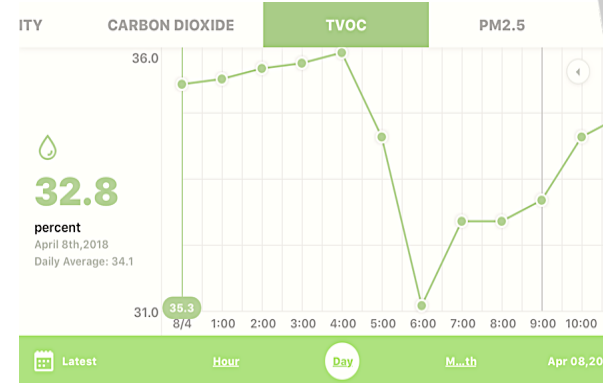
# Occupant is the IAQ Receptor



# The Original IAQ Monitors



Foobot  
*PM 2.5, Temperature, Humidity,  
Total VOCs, Carbon Dioxide*



uHoo  
*PM 2.5, Temperature, Humidity,  
Total VOCs, Carbon Dioxide, CO, Ozone,  
NO2, Barometric Pressure*





	Online Dashboard	WiFi or 4G	View Multiple Devices	View Overlapping Data Points	Report	\$	Dashboard Service Fee
airthinx	Yes	4G	Yes not at same time	Yes	No	~\$700 +	~\$350
AWAIR Omni	Yes	WiFi	Yes same time	No stacked	No	~\$399	~\$60/yr
air advice	Yes* device/data management	4G	Coming Soon	Yes	Yes	~\$2490 Yr 1 \$995 Yr 2	Included

# airthinx

5G/4G/3G

GPRS

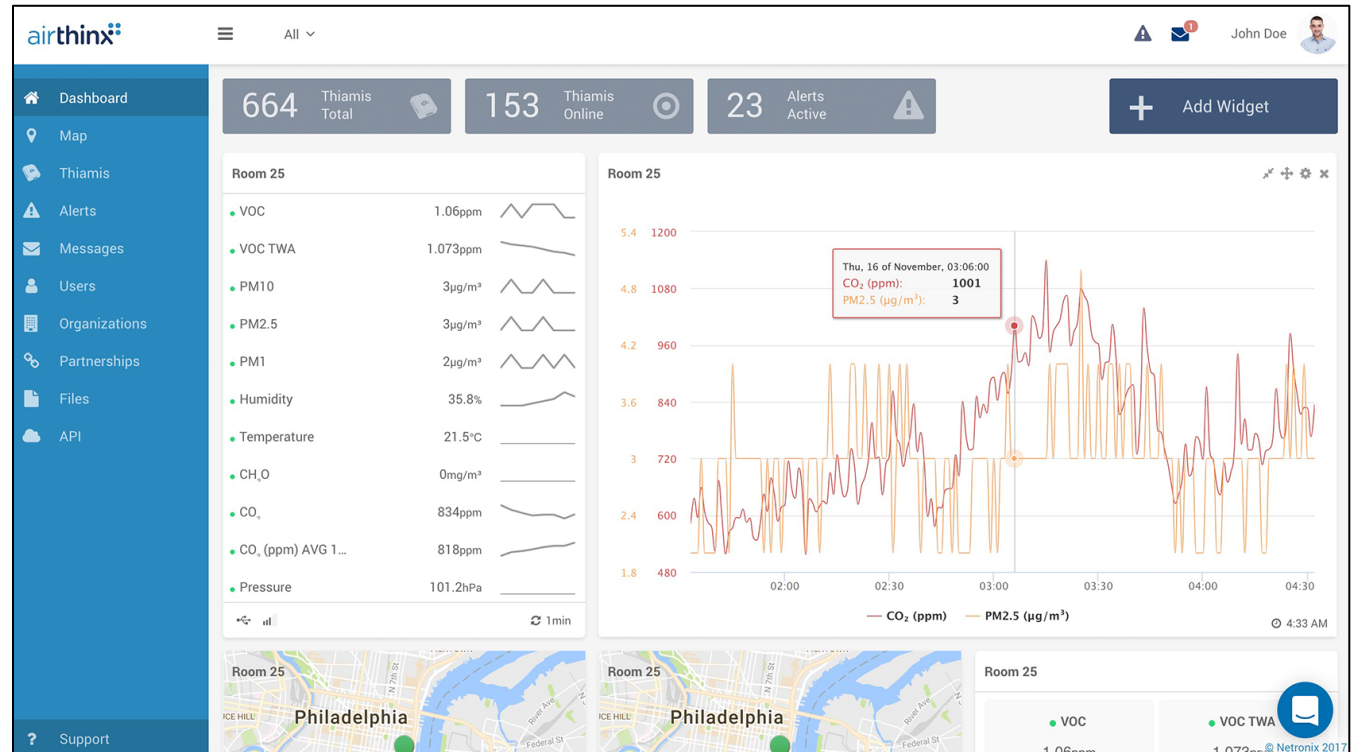
WiFi

Bluetooth

Mesh

LoRA

NB-IoT



 Dashboard Map Devices Alerts Users Organizations Partnerships Files API Filter... Manage

S/N ▾

Owner

Name

Description

Status

0C21 

Total Home Performance LLC



IAQ

0C23 

Total Home Performance LLC



AirThinx

0C24 

Total Home Performance LLC



IAQ

0C24 

AirThinx

0C25 

Hayward Score

AirThinx 

Replacement Device

0C25 

Hayward Score

AirThinx Joe Hayw...

IAQ 4/28

0C27 

TruTechTools

AirThinx 

device 1

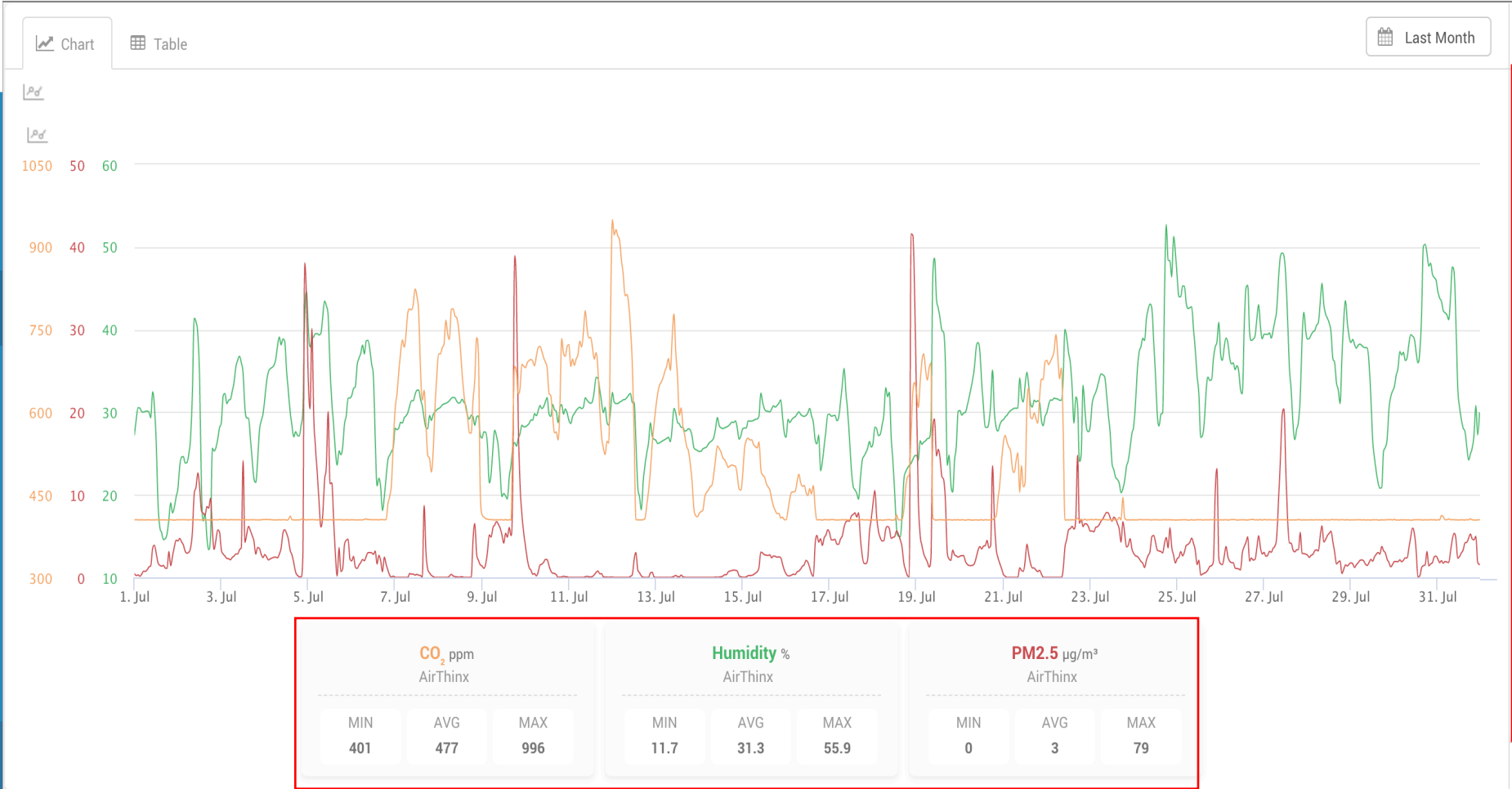
0C27 

AirThinx





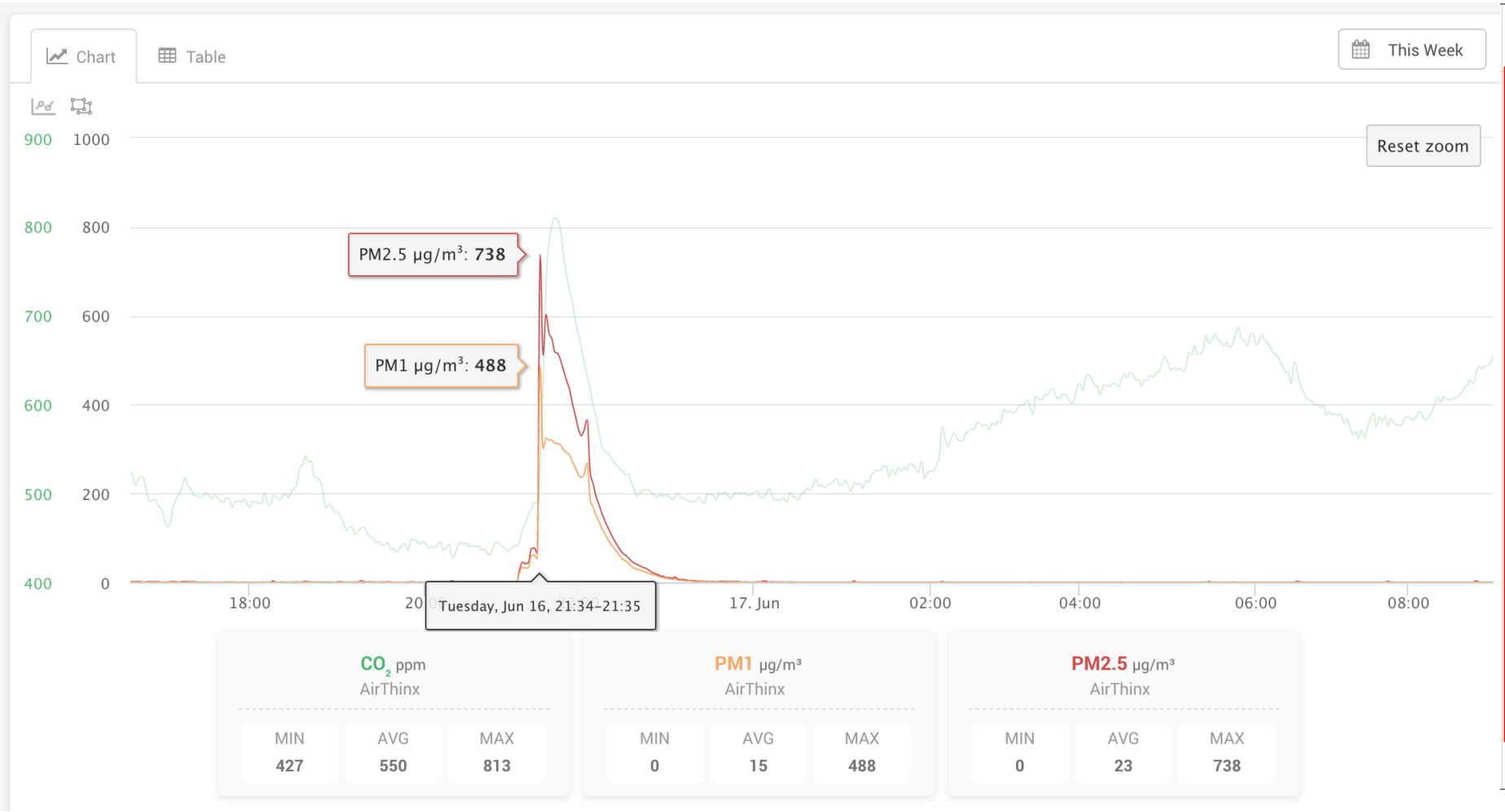
- Dashboard
- Map
- Devices
- Alerts
- Users
- Organizations
- Partnerships
- Files
- API



- DewPoint: 49.5 °F
- Humidity: 36.3 %
- PM: 7 µg/m<sup>3</sup>
- PM1: 4 µg/m<sup>3</sup>
- PM10: 5 µg/m<sup>3</sup>
- PM2.5: 4 µg/m<sup>3</sup>
- Pressure: 851.7 hPa
- Temperature: 25.8 °C
- Temperature: 79.4 °F

4:24 AM <1min

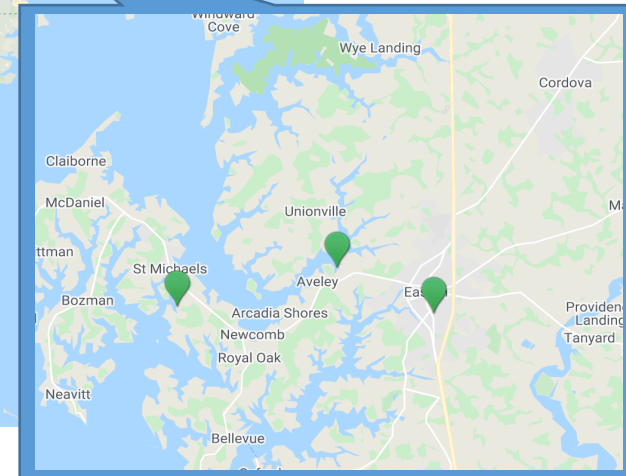
- Dashboard
- Map
- Devices
- Alerts
- Users
- Organizations
- Partnerships
- Files
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- DewPoint 49.5 °F
- Humidity 36.3 %
- PM 7  $\mu\text{g}/\text{m}^3$
- PM1 4  $\mu\text{g}/\text{m}^3$
- PM10 5  $\mu\text{g}/\text{m}^3$
- PM2.5 4  $\mu\text{g}/\text{m}^3$
- Pressure 851.7 hPa
- Temperature 25.8 °C
- Temperature 70.4 °F

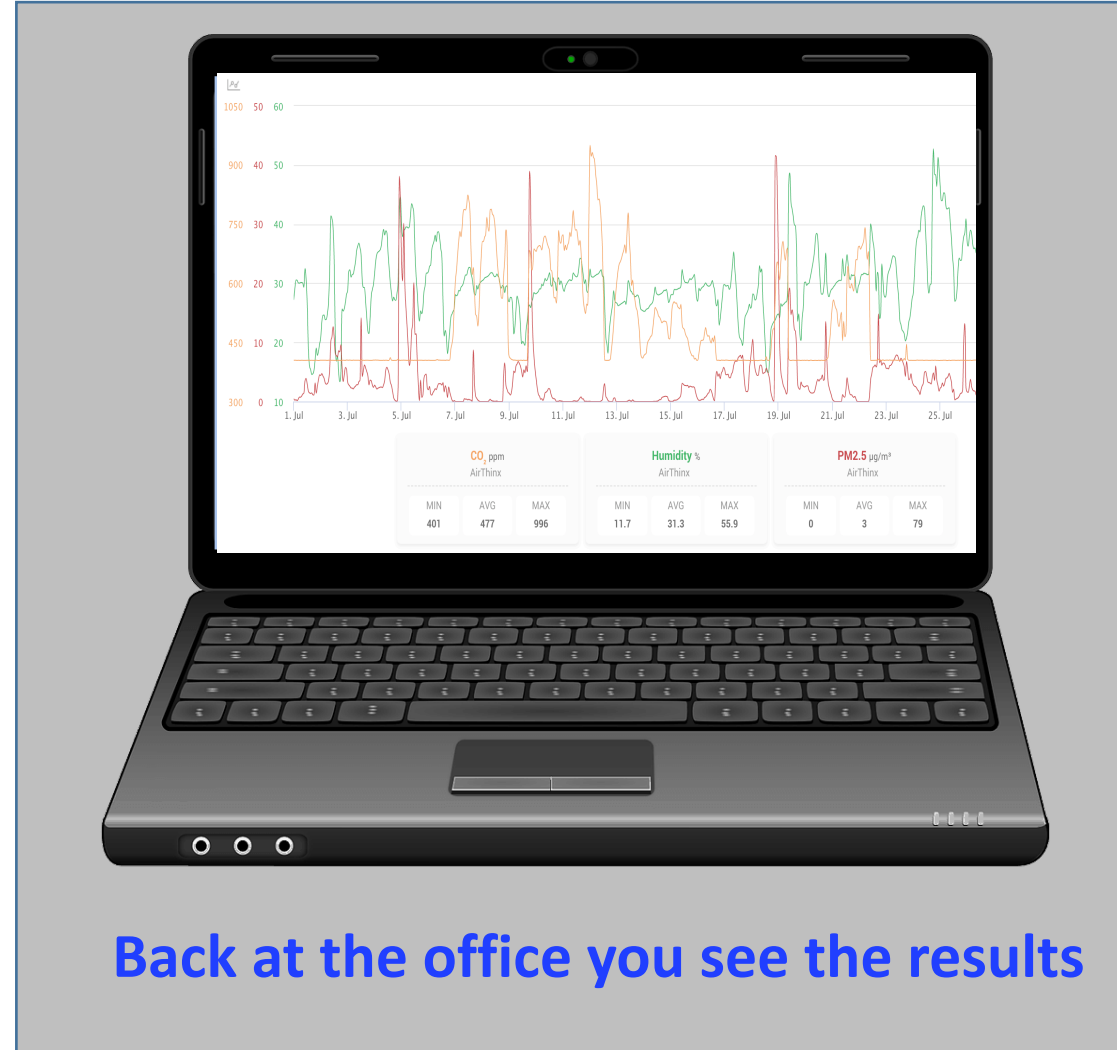
4:24 AM <1min

- Dashboard
- Map
- Devices
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- Organizations
- Partnerships
- Files
- API



# Drop it off or mail it – they plug it in and go!

Airthinx IAQ  
uses 4G  
*(no WiFi required)*



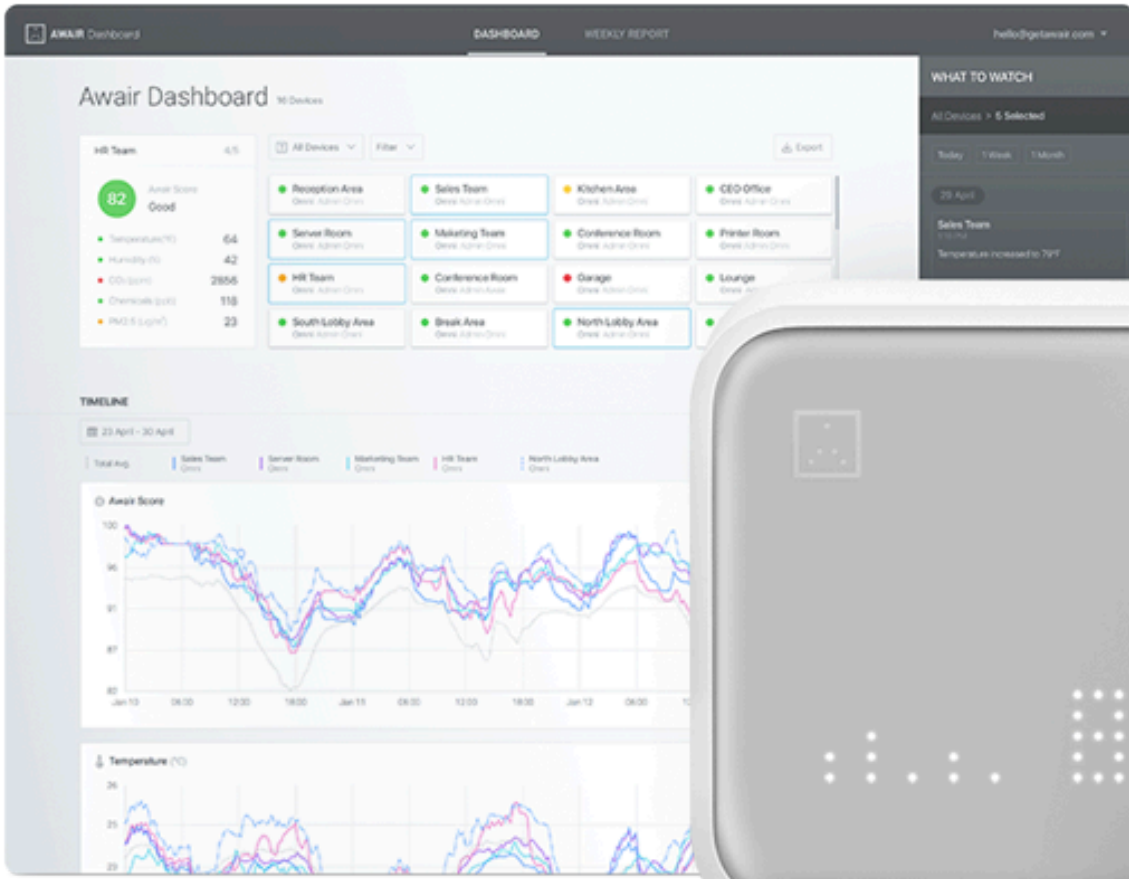
Back at the office you see the results

Stand was made by Joe Medosch





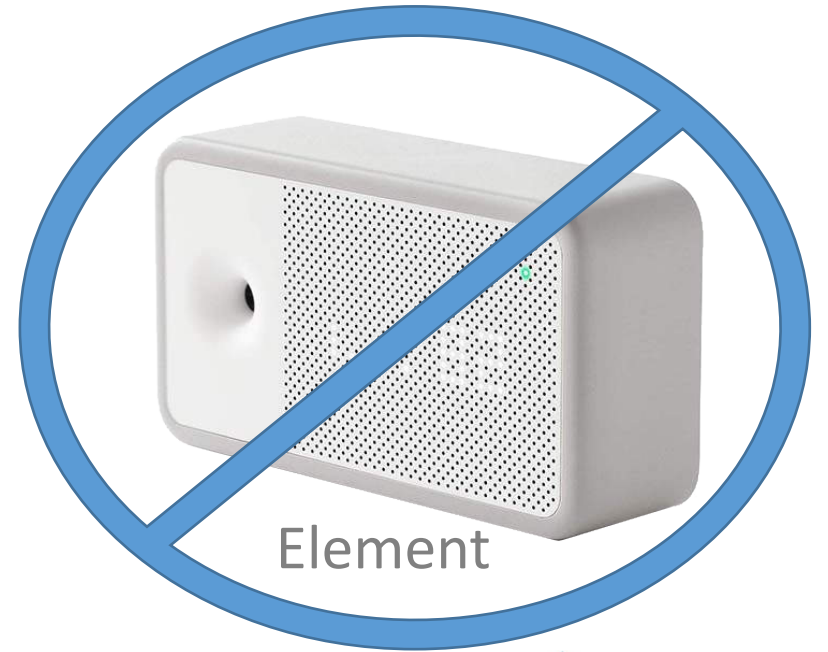
# AWAIR Omni



Includes internal battery



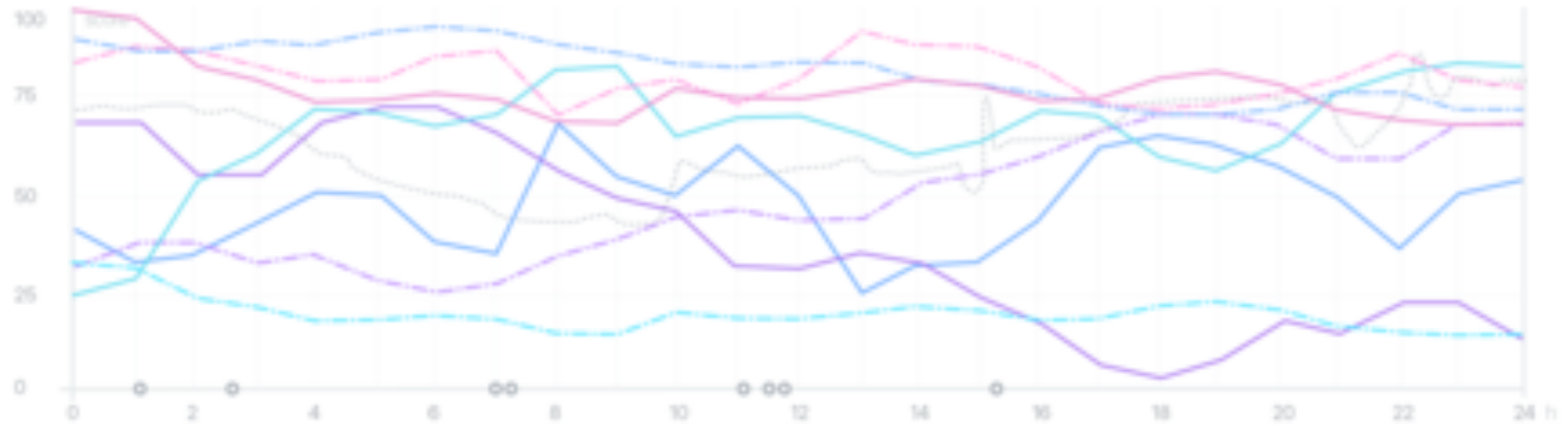
Front indicator lights display conditions.  
Fully customizable



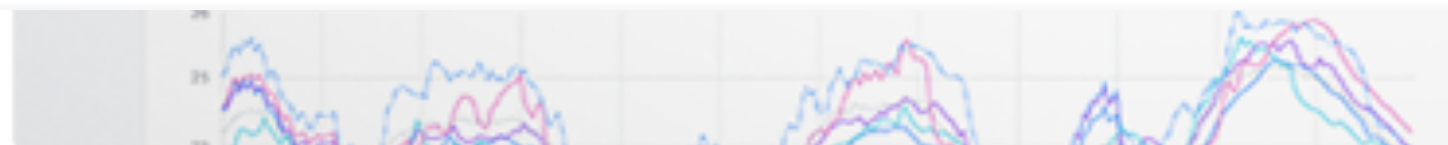
Element

Total Avg. Room 101 Room 107 Room 208 Room 301 Room 303 Room 306 Room 402 Room 404

### Awair Score



### Temperature



Server Room  
7 hours ago  
Added Humidifier

Joe Medosch's Omni

Location (All) ▾

Floor ▾

Status (All) ▾

1 Devices

☰ Newest

95

Awair Score  
Good

- Temperature (°F) 77
- Humidity (%) 45
- CO<sub>2</sub> (ppm) 576
- TVOCs (ppb) 289
- PM 2.5 (µg/m<sup>3</sup>) 1
- Light (lx) 5
- Noise (dB) 51

● Joe Medosch's Omni  
Omni

TIMELINE

📅 1 Jul 202

**These series of slides are animated – they are intended to mimic the dashboard**

🔍 Awair score



🌡️ Temperature (°F)

80

# Awair Omni Dashboard





🌡 Temperature (°F)



💧 Humidity (%)



# Awar Omni Dashboard





# Awar Omni Dashboard

## Humidity (%)



## CO<sub>2</sub> (ppm)



## TVOCs (ppb)

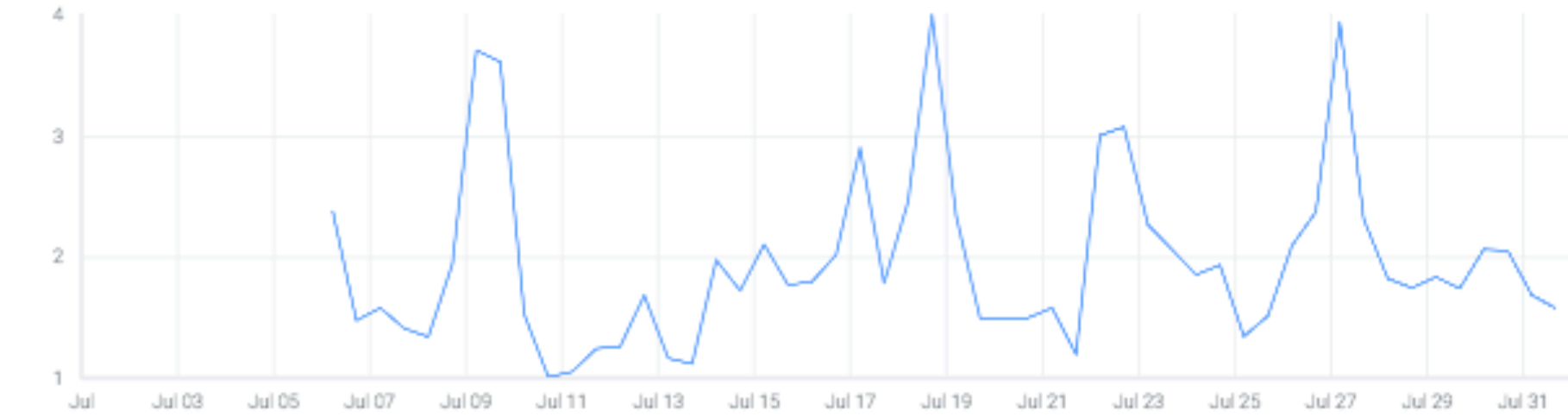




TVOCs (ppb)



PM 2.5 ( $\mu\text{g}/\text{m}^3$ )



# Awair Omni Dashboard



# The M5200 IAQ Monitor from AirAdvice

## *A Complete Report in 30 Minutes*

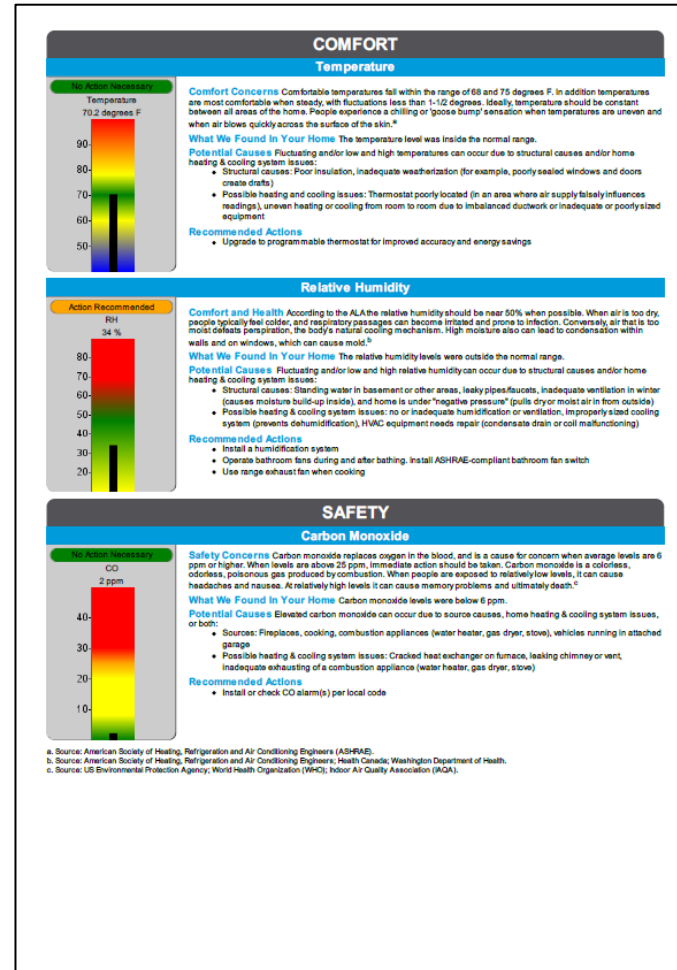
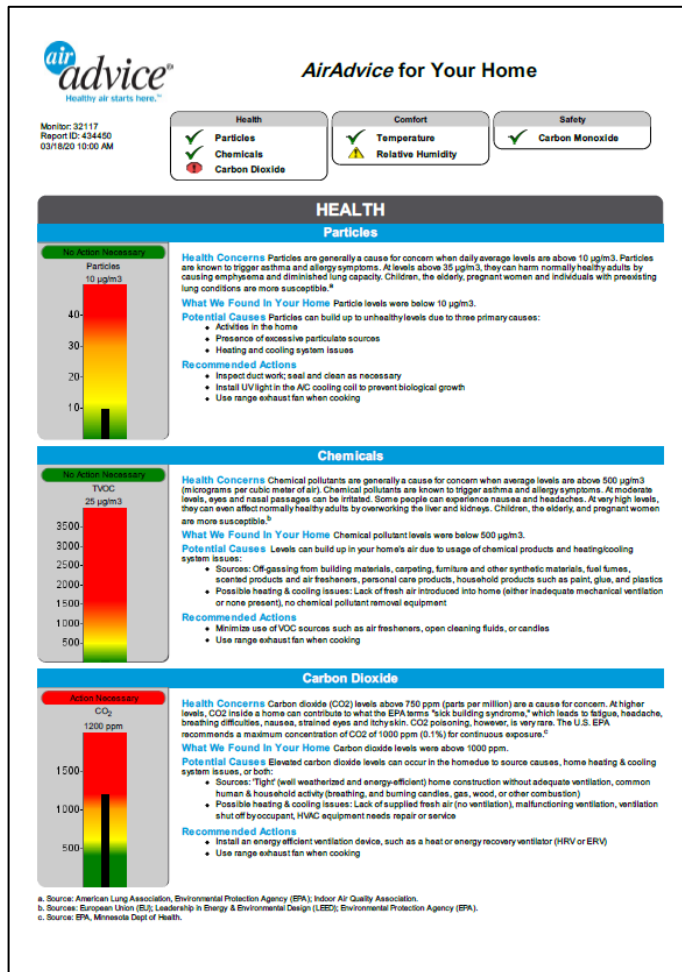
**Plug in the power cord.**

**An email is sent to the Technician in 30 minutes.**

***Test for Opportunities on Every Call!***

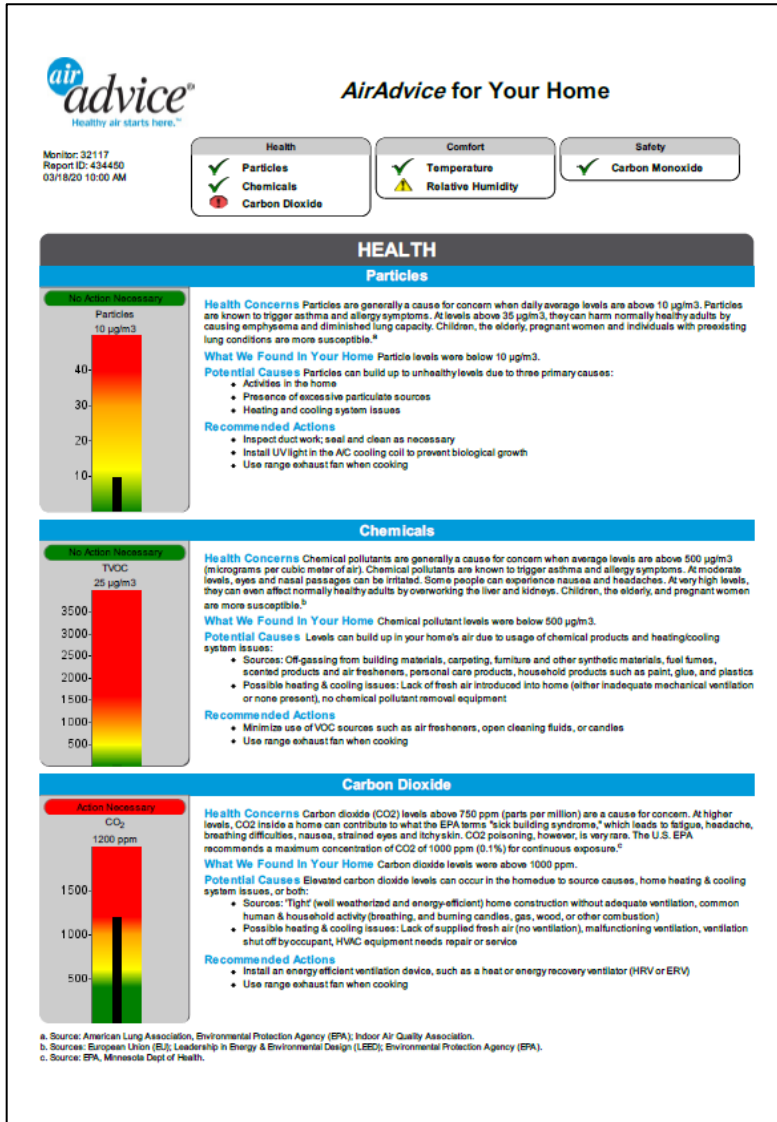


# The AirAdvice 30- min. FlashReport



- Particles
- VOCs
- CO<sub>2</sub>
- Temperature
- Relative Humidity
- CO

# AirAdvice 30-Minute Report



➤ Fully Automated; emailed directly to user.

- For each of the 6 IAQ Parameters:
  - Why the parameter is important
  - What was found in your home
  - Recommended solutions

*AirAdvice Report Provides:*

Quantified levels

3<sup>rd</sup> party data

Consumer awareness

Product recommendation

Sales opportunity

• “An IAQ conversation on every call”





# SmartIAQ Report (multi-day Report)

## AirAdvice® for Your Home

Prepared For:  
J Vitandre  
Address Held  
Hillsboro, OR 97124

Conducted By:  
Revival Energy Group  
503-893-8243

Test Period:  
11/27/13 – 12/3/13

Monitor ID:  
#30183

Report ID:  
#209314

This report offers recommendations so you can make informed decisions about the health, comfort and safety your building provides. Knowing what's in the air you breathe and what you can do about it has never been more important. If you have additional questions, please visit [www.airadvice.com](http://www.airadvice.com) or call 503-295-6610.

## AirAdvice® for Your Building

Prepared For:  
EOG EOG  
212 Old Grande Blvd.Suite A-200  
Tyler, TX 75703  
(903) 283-9273

Conducted By:  
AirAdvice for Homes, Inc.  
503-396-4091

Test Period:

This report offers recommendations so you can make informed decisions about your building occupants' health, comfort and safety. Knowing what's in the air you breathe and what you can do about it has never been more important. If you have additional questions, visit [www.airadviceforhomes.com](http://www.airadviceforhomes.com) or call 888-959-4686.

**HEALTH**

**COMFORT**

**SAFETY**

**Action Necessary**

**Particle Allergens, Chemical Pollutants, Carbon Dioxide**

**Particle Allergens:**  
Levels are significantly elevated

**Chemical Pollutants:**  
Levels improvable

**Carbon Dioxide:**  
Levels improvable

**Possible Causes**

- Inadequate filtration
- Inadequate fresh air introduction
- Build-up of chemical pollutants

**Recommended Action**

- Upgrade ventilation
- Add VOC reduction device
- Remove VOC sources
- Upgrade filtration

### Health: Particle Allergens

**TEST RESULTS**

**What We Found:** Allergen levels were above 35 ug/m3 for one or more days.

**Action Necessary**

**Why is action necessary?**

Particle allergens are generally a cause for concern when daily average levels are above 10 ug/m3.

Particle allergens are known to trigger asthma and allergy symptoms. At levels above 35 ug/m3, they can harm normally healthy adults by causing emphysema and diminished lung capacity. Children, the elderly, and pregnant women are more susceptible.

Source: American Lung Association; Environmental Protection Agency (EPA); Indoor Air Quality Association (IAQA).

**ABOUT PARTICLE ALLERGENS**

Particle allergens are always present in your home's air. They can build up to unhealthy levels due to activities in the home, the presence of excessive sources, and heating & cooling system issues.

Sources: Pets, dirt on shoes, burning candles, smoking, open windows (outside pollen, spores, etc.), dust mites, many common household activities, including cooking and cleaning.

Possible heating & cooling issues: Leaky, dirty, or poorly designed ductwork, inadequate filtration, no filtration at all.

**RECOMMENDED ACTION**

There are many steps you can take to control sources of particle allergens. You can:

- Clean, replace or upgrade Filter
- Clean duct work
- Use the exhaust fan during cooking
- Use a HEPA or whole-home vacuum
- Reduce the use of incense or candles

**HEALTH**

**Temperature, Relative Humidity**

**Action Necessary**

**Temperature:**  
Too cool

**Relative Humidity:**  
Too dry

**Possible Causes**

- Inadequate temperature setpoint or inadequate thermostat
- Inadequate humidification
- Setpoints out of alignment

**Recommended Action**

- Check thermostat for proper setpoint and function
- Upgrade humidification system

**SAFETY**

**Carbon Monoxide**

**No Action Necessary**

**Carbon Monoxide:**  
Levels are acceptable

**Possible Causes**

- None

**Recommended Action**

- No action necessary

Highest Daily Average: 49 ug/m<sup>3</sup>    Highest Hourly Average: 131 ug/m<sup>3</sup>    Overall Average: 23 ug/m<sup>3</sup>

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A healthy home starts here™

HAYWARD SCORE



# Joe's Recommendations

- Purchase 2 or more monitors
  - More coverage
  - Can check monitors stability with each other
- Look at the app and or online interface to determine the data and information
- Spend more money on a better device

# Joe's Perfect IAQ Monitor

- 4G (5G) and has WiFi
- Change the units it displays
- Add remote mini- sensors
- Internal battery and works with battery packs
- Has a the ability use with a tripod (1/4-20 screw)
- Can take outside and zero the device



# Active Spread Sheet

## Readings

- Temperature
- Humidity
- Dew Point
- TVOCs
- Formaldehyde
- CO2 Carbon dioxide
- CO Carbon monoxide
- NO2 Nitrogen dioxide
- PM 1.0, 2.5, 10
- Ozone
- Air Pressure / Barometer
- Ambient light - lux
- Sound - dBA
- Local Whether

## Sensor

- Self Calibration
- Factory Calibration
- Passive or fan assist

## Connectivity

- 3G / 4G/ 5G
- WiFi
- Bluetooth / range
- Collects data if not connected to cloud
- Phone app
- Web access
- Cloud storage
- Integrates w/ other devices
- API

## Power

- 120v
- Portable - internal battery
- Portable - works off a battery pack
- USB power

A	B	C	D	E	F	G	H
	ALPHABETICAL Updated 2020-05-26	Air Advice	AirThinkx - standard	(IAQ) AirVisual Pro	Atmotube PRO	Awair 2 Element	Awair Omni
Type		Contractor	Commercial / Residential	Residential / Maybe small commercial applications	Personal Portable monitor	Residential	Consumer
Esta Price for unit (as of June 2020)		\$1,200	\$699	\$269	\$149	\$149	\$300
Monthly / anual service fee		Yes	\$299	No	No	-	\$60
Visual Display		Minimal -	Connectivity and Alert single color	Full color display	No	Yes - minimal - can be changed	Yes - minimal - can be changed
Display can be turned OFF		Yes	Yes	Yes	NA	Yes	Yes
<b>Readings</b>							
Temperature		Yes	Range - 0-99°C Resolution - 0.1 °C Maximum Error - ±0.5 °C	14 - 104°F	Yes	-40 to +125°C (-40 to +257°F), +/- 0.3°C	Range: -40 to 125°C (-40 to 257°F) Accuracy: +0.2°C (=/- ~3° F)
Humidity		Yes	Range - 0-99 %RH Resolution - 0.1 %RH Maximum Error - ±2 %RH	0 - 95%	Yes	0 to 95%, +/- 3%	Range: 0-100% RH Accuracy: +2% RH
Dew Point		No	Yes	No	No	No	No
TVOCs		Yes	PPM Effective Range - 1~30ppm of EtOH Sensitivity - 0.15 ~ 0.5 Rs (10ppm of EtOH)/ Rs (air)	No	Yes	0 to 2014 ppb	TVOC Range: 0-60,000 ppb Accuracy: +10%
Formaldehyde		No	CH2O Sensor Effective Range - 0~1 mg/m3 Resolution - 0.001 mg/m3 Maximum Error - < 5% FS		No		
CO2 Carbon dioxide		Yes	Effective Range - 0~3000 PPM Resolution - 1 PPM Maximum Consistency Error - ±50ppm+5%FS Single Response Time - < 3 sec. Total Response Time - ≤ 25 sec	CO2: 400 - 10,000 PPM	Yes	0 to 4000 ppm, +/- 75ppm	Range: 400-5,000 ppm Accuracy: + 75 ppm or +10%

link - <https://bit.ly/36t1jPZ>