



AIR QUALITY EGG®



Air Quality Egg 2018 Model

USER GUIDE

Monitors:

Particulate Pollution (PM1.0, PM2.5, PM10)

Temperature

Relative Humidity

Barometric Pressure

Setup Quick Start

1. Download and install the Air Quality Egg configuration tool.
<https://airqualityegg.com/setup>
2. Take your egg out of the box and clip the base tabs to the vent holes.
3. Plug the egg into your computer.
4. In the configuration app, select 1. Set Wi-Fi. Enter network name (SSID) and password. Click “Apply”. Wait a couple of minutes for “success”.
Go to the egg portal: **www.airqualityegg.com/portal**
5. Sign up and click the validation email we send you.
6. Claim the egg as yours: Eggs > My Eggs > .

The Wicked Device channel on **YouTube** has a video in the Air Quality Egg channel called [1. Getting your Egg Online](#) which is **strongly recommended**.

Introduction

The Air Quality Egg “2018 Model” AKA Version 2 is a Wi-Fi enabled sensor unit which detects:

- Temperature (User configurable to Celsius or Fahrenheit).
- Relative humidity
- Barometric Pressure
- Particulate pollution in three sizes: PM1.0, PM2.5 and PM10.

Particulate pollution has been identified by the US Environmental Protection Agency (EPA) as a 'criteria pollutant', considered harmful to public health and the environment. The Egg displays current readings on the front panel, and uploads them to the internet via your Wi-Fi network for graphing and analysis.

You can interact with your egg using any one of the following methods:

1. Web portal at www.airqualityegg.com.
2. Android app from the Play Store
3. iPhone app from the App Store
4. Directly connecting with a serial interface

For more information about the EPA's National Ambient Air Quality Standards, visit <http://www.epa.gov/ttn/naaqs/criteria.html>

Place the Egg in a sheltered location or (if inside) near the center of the space you wish to measure. Exposure to extended direct sunlight or excessive moisture may permanently damage the unit.

The unit needs to be set up to connect to your Wi-Fi network before it can post data online. This and claiming your data are the only setup steps.

NOTE: THE EGG IS NOT A SAFETY-OF-LIFE DEVICE. THE EGG IS NOT A MEDICAL DEVICE. DO NOT USE IT AS A SUBSTITUTE FOR CORRECT WARNING AND MONITORING SYSTEMS.

What is particulate pollution?

The air contains small particles, less than 10 μm in size, which can be harmful to human health. These are regulated by the US Environmental protection agency (EPA). **The best source for particle pollution information is the EPA website, www.epa.gov.**

This unit detects particles from 0.5 μm to 10 μm (particles larger than 10 μm are not regulated by the EPA) and provides an aggregate measure of both PM10 and PM2.5, reported in micrograms per cubic meter.

Evidence indicates a clear relationship between exposure to particulate matter and effects on health, particularly smaller particles that can reach the deep regions of the lungs.

PM10 and PM2.5 are defined in ISO 7708:1995 as:

PM10 – particles which pass through a size-selective inlet with a 50 % efficiency cut-off at 10 μm aerodynamic diameter.

PM2.5 – particles which pass through a size-selective inlet with a 50 % efficiency cut-off at 2.5 μm aerodynamic diameter.

This means for PM10 the median diameter is 10 μm . Half the particles are larger, and half are smaller. Similarly, for PM2.5, the median diameter is 2.5 μm .

PM2.5 is also called the “High risk respirable condition”, because smaller particles can get lodged deep into your lungs, causing a variety of adverse effects.

Figure 1: Particle Size Comparison:

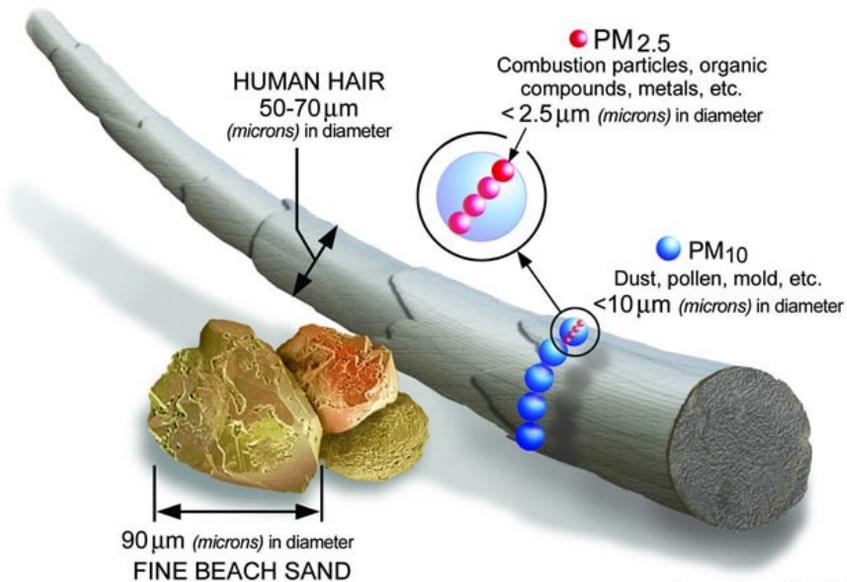


Image courtesy of the U.S. EPA

Setup: Telling your Egg about Wi-Fi

Note: Watching the YouTube video is an easy way to get started. See next page.

The very first thing you need to do is connect your Egg to your local Wi-Fi hotspot¹. Here are the steps:

1. Download and install the Air Quality Egg configuration tool onto your Windows/Mac/Linux computer.
<https://airqualityegg.com/setup>
2. Take your egg out of the box and clip the base tabs to the vent holes or set it on the stand.
3. Plug the egg into your computer's USB port.
4. Make sure you are in range of the Wi-Fi network you wish to connect to.
5. In the configuration app, select option **1. Set Wi-Fi**.

Enter network name (SSID) and password.

Click "Apply". Wait a couple of minutes for "success".

¹ It is possible to operate the Egg in offline (datalogging) mode, which saves data to the SD card. This advanced mode is not covered in this manual.

The Air Quality Egg channel on **YouTube** has a video in the Air Quality Egg channel called [1. Getting your Egg Online](#) which is **strongly recommended**.

Search YouTube for
Air Quality Egg

[Link to video](#)

Setup: Claiming Your Data

The Egg will publish data after it connects to the internet. In order to name the egg and locate it on the map you will need to claim it as yours. This step requires your **Egg serial number** and **Claim code**, shipped with the egg.

On your laptop / smartphone:

1. Go to the egg portal: **www.airqualityegg.com/portal**
6. Sign up and click the validation email we send you.
7. Claim the egg as yours. Go to:

Eggs > My Eggs > Green “+” sign, .

Enter the serial number and claim code provided.

It takes approximately 30 minutes for the data to stabilize the first time.

The Egg Portal

All data and settings are controlled through the Air Quality Egg portal
www.airqualityegg.com/portal

Data refreshing

Data from the egg is refreshed every five minutes. Watch the Air Quality Egg channel YouTube videos for additional information.

Egg icon color

On the Eggs screen, icon color indicates the following:

- Green: All values are in safe limits
- Yellow: At least one value is higher than ideal
- Red: At least one value is at a level which you should pay attention to.
- Grey: The egg has not reporting new data in the last 5 minutes. Check it is online.

Egg Screen Display



The Egg can either be in operational mode or configuration (setup) mode. During operational mode, the display shows:

- Temperature (TEMP) in either Fahrenheit or Celsius.
- Relative humidity percentage (RH)
- Particulate pollution in micrograms per cubic meter in three sizes, PM1.0, PM2.5 and PM10 ($\mu\text{g}/\text{m}^3$)

During configuration mode, the screen shows “CONFIG MODE”.

Creating Labs

Labs are used to save data for later, compare data and email results to yourself for additional analysis. To create a lab, select Labs > My Data > 

1. Choose a type of pollutant to monitor.
2. Give it a title which makes it easy to search.
3. Choose one or more eggs to add to the lab.
4. Labs have a set start and end, so you need to set that.

5. Choose a location. If the eggs in the lab do not have a location set by the owners, you will have to choose one.

Labs are updated every **6 hours**. This means you won't see any data in the lab right away, even though it is running correctly.

You can create a lab using your data, or other eggs, or both.

There are two ways to see the data:

A lab collects new data, and displays it.

A comparison allows you to compare existing labs to each other.

Using the Egg

The Indoor Egg has two holes at the top which can be used to thread a string to hang the unit. The Outdoor can be hung on a wall or on the stand provided.

The egg must be upright to function correctly.

DO NOT cover the fan port or fan intakes while unit has power.

Note that the LCD backlight does not work while unit is resolving the internet connection, unless you touch it during the 12 second startup window.

Specifications

TYPE	SYMBOL	VALUE
Width x Height x Thickness-indoor	Millimeters	140x140x85
Width x Height x Thickness-outdoor	Millimeters	50x147x147
Weight (indoor)	oz	7.2
Weight (indoor)	grams (approx.)	250
Weight (outdoor)	oz	26
Weight (outdoor)	grams (approx.)	740
Unit operating range	degrees Celsius	0 to 40
USB power supply operating range	degrees Celsius	0 to 40
Temperature accuracy	degrees Celsius	0.2 ¹
Humidity accuracy	% relative hum.	1.8 ²
Humidity range	% relative hum.	0 – 99
Minimum detectable particle size	micrometers	0.3
Maximum detectable particle size	micrometers	10
Particle detection range	particles	0 – >1000
Typical max sensor response time	seconds	30
Data transfer frequency	seconds	5
Transmission Range	meters	70 ³
Sensor life expectancy	years	3

1. Temperature accuracy below 0C no worse than 0.5C
2. Humidity accuracy below 10% and above 90% no worse than 4% RH
3. Transmission range under ideal conditions. Reduced by walls and objects.
4. Temp and humidity sensor datasheet: <http://tinyurl.com/sht25datasheet>
5. If relative humidity (RH) varies by more than 20% in 15 seconds, or is <15% RH for 30 days or more, unit may require recalibration.
6. If unit is exposed to excessive smoke, for example holding a cigarette at the air intake to 'test' it, unit will require cleaning and recalibration.
7. Particulate sensor: Dual Plantower PMS5003 sensors. See separate datasheet.

Precautions

- Do not subject the unit to excessive force, shock, dust, temperature or humidity. Doing so may cause permanent damage.
- Do not attempt to 'test' the unit by exposing it to excessive smoke, eg: by placing a cigarette at the air intake. This will over expose the sensor and compromise accuracy, requiring recalibration.
- To clean, disconnect power and dust with a slightly damp cloth. Do not use solvents.
- Do not cover the ventilation holes of the fan. This will give inaccurate results. Covering the fan could result in an electrical short, shock and fire.
- Do not tamper with the unit's internal components. This invalidates the warranty and is dangerous.
- Keep out of reach of children.
- Use only the supplied 5v power supply.
- This unit is intended for indoor operation, or outdoor operation in a protected location. Do not expose to precipitation, direct sunlight or heat.
- Images shown in this manual may differ from the actual product.
- This product contains leaded PCBs and components.
- When disposing of this product, do so responsibly.
- Placing this unit in direct sunlight or heat invalidates any warranty.

NOTE: The technical specifications of this product and the contents of this user manual are subject to change without notice.

All readings are temperature dependent. That means placing the unit in direct sunlight, above a heater or radiator or otherwise exposed to unusual heat or cold will result in inaccurate readings and may permanently damage it.

Troubleshooting

Issue	Solution
Computer does not show a USB / serial port when plugging the egg in.	This should be automatic, but is not on all machines. Install the FTDI drivers from here: http://www.ftdichip.com/Drivers/VCP.htm
Displays “Config integrity check failed”.	<ol style="list-style-type: none">1. Your device has tried to connect with the information you provided, and is unable to do so. It will keep trying, and if the information is correct, it will connect.2. If you still can't connect, you may need to explicitly set the security mode. See 'changing defaults settings' above.
Does not display gas concentrations.	There is a warm up period as the Egg collects enough data to start displaying results. If it still does not display results after 20 minutes, post to http://help.wickeddevice.com for help.
Cannot connect to Wi-Fi, even though Wi-Fi credentials are added.	<ol style="list-style-type: none">1. Check Wi-Fi credentials are correct.2. Move Egg closer to Wi-Fi router. RSSI should be at least 80 during setup.3. If you still cannot connect, make sure that your wireless security policy allows

	connections. If not, consult with your IT department to add the Egg's MAC address to the allowed devices list.
LCD screen is dark.	The Egg contains a touch sensor switch. Cover the left hand side of the egg with your hand for several seconds to turn on the LCD panel.

Education, Curriculum and Training

We provide a variety of educational tools, training and curriculum aimed at middle and high schools, as well as teacher training. Please contact jill@airqualityegg.com for details.

Buy an Egg: www.airqualityegg.com

About the Egg

Visit our website, www.airqualityegg.com, to learn more.

FCC Statement

The Texas Instruments CC3000 Wi-Fi module complies with Part 15c of the FCC rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

WARNING: Changes or modifications not expressly approved by the party responsible for compliance will void the user's authority to operate the equipment.

THE UNIT IS DISTRIBUTED IN THE HOPE THAT IT WILL BE USEFUL, BUT WITHOUT ANY WARRANTY. IT IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE UNIT IS WITH YOU.

Revision History:

April 20, 2015	Initial version
May 5, 2015	Specs
May 12, 2015	Claiming
May 20, 2015	Setup
June 22, 2015	Troubleshooting
June 25, 2015	Fix PPM/PPB typo
July 14, 2015	Troubleshooting
September 10, 2015	O3, SO2 changes
September 15, 2015	Particulate pollution
February 5, 2016	Opensensors, download
Jun 16, 2017	Major revision
July 30, 2018	Major revision

