

Air Quality Field Testing – Equipment Installation Guide

How to unpack, install, and re-pack the air quality monitoring equipment

This document explains unpacking and setting up the monitoring equipment in your home, as well as how to pack up and return the equipment at the end of the testing period.

Shipment Box

TNO, a Dutch research organisation, will ship you a cardboard box containing a briefcase via the courier DHL that contains the air quality monitoring equipment for the study. Please keep both the cardboard box and briefcase to return the equipment. The cardboard box, containing the briefcase, will be collected from households on **Friday 26 May** to return the equipment to our laboratory. Once the equipment has been returned and we have confirmed you have provided all necessary measurements, you will receive your participation incentive.



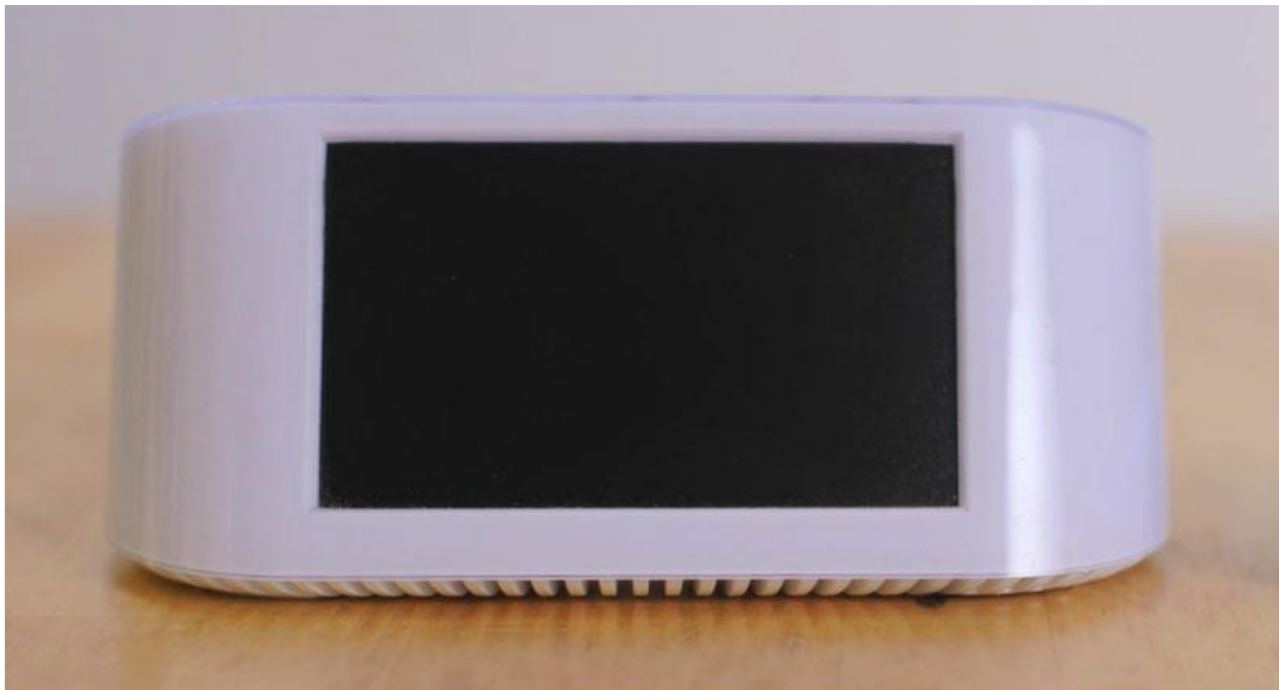
Inside the box and briefcase is:

- One blue cylindrical Envea air quality sensor for measuring nitrogen dioxide (NO₂)
- One blue cylindrical Envea air quality sensor for carbon monoxide (CO)
- One white IQAir sensor for measuring carbon dioxide (CO₂) and particulate matter (PM_{2.5})
- Four glass tubes for measuring nitrogen dioxide (NO₂), in a plastic tube and plastic bag
- Two or three button-sized temperature sensors and two or three pieces of foil tape in a small plastic bag
- One power adaptor and socket **and an adapter for UK**
- Three USB cables for the two blue cylindrical sensors and white IQAir sensor
- Paperwork, including equipment set-up/take down record, DHL Return Label

Set Up Instructions

- Equipment will be delivered to you by **Friday 12 May**.
- Please set up the equipment by **Saturday 13 May at midday** at the latest, and then pack it up preferably 1 hour after cooking the hot meal in the evening before the collection date. The equipment will be picked up on **Friday 26 May**.
- Included in the box is a form you must complete – please record when you set up and took down your equipment, specifically, the four glass NO₂ tubes.

White IQ Air Sensor



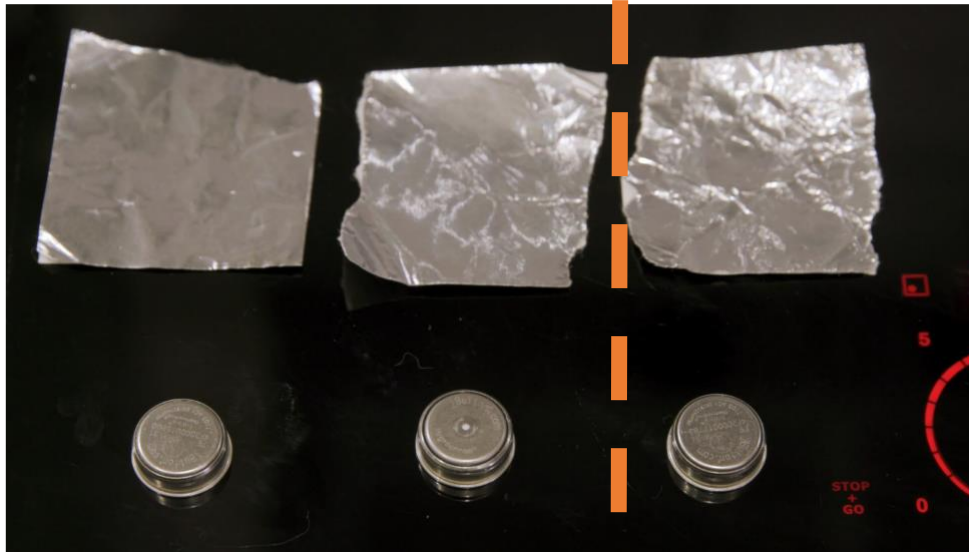
- Measures carbon dioxide (CO₂) and particulate matter (PM_{2.5})
- Needs to be connected to a USB power source
- Device will start-up when connected to the power source and start measuring air quality
- You can hear a small fan while it is running – this is used to sample air in the room
- Ideal location for set up: between 1 and 3 metres from the cooking area; not above or below the cooking area but elsewhere in the kitchen; not near an open window or door
- Screen should be off during the two weeks. Press power button on the left for 1 to 2 seconds to turn off the screen.

Two Envea Blue Cylindrical Microsensors



- One measures nitrogen dioxide (NO₂) and one measures carbon monoxide (CO)
- Needs to be connected to a USB power source
- Device will start-up when connected to the power source and start measuring air quality
- You can hear a small fan while they are running – this is used to sample air in the room
- Ideal location for set up: directly next to the white IQAir Sensor; between 1 and 3 metres from the cooking area; not above or below the cooking area but elsewhere in the kitchen; not near an open window or door
- Please do not disconnect from the power supply when in use
- If there is a power outage and the devices are switched off, please switch them back on as soon as possible.

Temperature Sensor Buttons (iButtons)

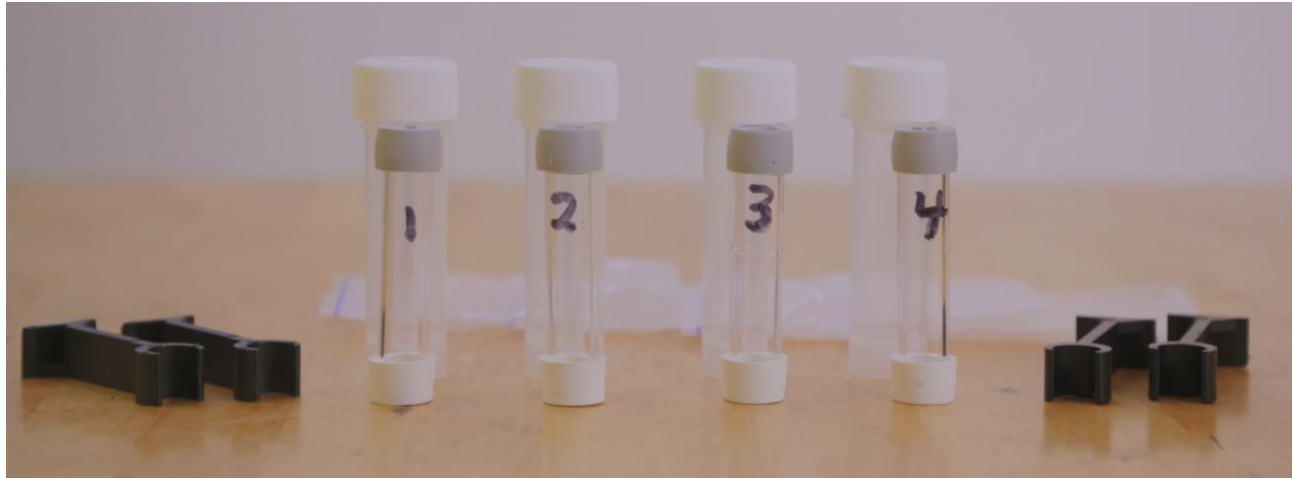


- Tracks time and measures temperature around them. Stored data will provide information on when you are cooking on your hob (or oven)
- Does not need a power source. Devices are programmed to start measuring when the shipment arrives at your home.
- Do not make any sound and are water resistant, impact resistant
- Two buttons should be placed on your hob – one between the two burners on the left and one between the two burners on the right



- If you have indicated during recruitment that you have a gas oven you might have received a third button (marked with a "3"), place it on the gas oven door
- To place the buttons, clean the surface and peel back the foil tape, and stick it on the buttons to hold them in place and protect them
- The tape will not damage your hob or your oven door, but it may leave a small residue which can be easily removed with soap and warm water

Glass Tubes for Passive NO₂ Measurements



- Four numbered glass tubes to measure nitrogen dioxide around your home. The grey lid is the top and the white lid is the bottom
- Each tube arrives in a sealed plastic tube, in a plastic bag. **Remove the glass tube from the plastic tube**, and place the plastic tubes and bags back in the briefcase to be used when repackaging equipment two weeks later.
- Install tubes only when ready to start the two week measurement period. Record the time you set up the four tubes on the form provided in the briefcase.
- Please make sure the glass tubes have been removed from the plastic tubes before setting up the tubes.
- Place the numbered tubes in the following locations:
 - **Tube #1** in the kitchen. Place in same location as the blue and white sensors. If possible, install in a holder just above the other three devices.
 - **Tube #2** in the living room, or where your household spends the most time. Should be out of the way; not near an open window; and not near the floor or ceiling.
 - **Tube #3** in a bedroom, ideally a child's bedroom if you have one. Should be out of the way; not near an open window; and not near the floor or ceiling.
 - **Tube #4** outside your home. If possible, place on the outside wall that provides ventilation air for the kitchen. Should be out of reach from neighbours or passers by; not within 1m of the corner of the house (to avoid high wind speeds); not within 2m of a ventilation outlet or heater exhaust. If you cannot place it as described, it can be installed in your garden or on another outside wall or window. The goal is to measure air quality outside your home where the tube cannot be damaged or interfered with.
- If you see a fifth tube, please leave it in the briefcase. This is for recording air pollution during shipping.
- To set up the tubes, clean and dry the surface, peel off the tape on the black plastic mounting clip and stick the holder to the wall.
- A tile or glass surface is best to avoid damage to paint. For example, a window or a picture frame.
- Carefully clip the tubes into the holders with the white cap facing downward

Lead Life as Normal for Two Weeks

- Once all the equipment is installed, please lead your life as normal. This includes cooking normal meals for yourself and your family in the same way you usually do.
- Complete the daily cooking diary using the online app to help us better understand the data that the equipment collects:
 - Download the app following the instructions that have been shared by the recruiter.
 - The diary will involve you taking and uploading a picture of the meals that have been cooked each day and answering a follow-up question about ventilation.
 - Complete the diary every time you prepare hot food.

Taking Down and Packing Up Equipment

- Once the two weeks have passed, dismantle the equipment to be sent back to TNO where the data will be analysed in a laboratory.

Two Envea Blue Cylindrical Microsensors

- Remove the USB power cables from the back of the devices and place them in the right compartment in the briefcase, as shown below.
- These devices do not have an internal battery, so once they are unplugged for shipping, they are off.

White IQ Air Sensor

- Remove the USB power cables from the back of the device and place it, with the adapter(s) in the right compartment in the briefcase, as shown below.
- Device includes an internal battery. Please turn off the device once it has been unplugged at the end of the two weeks, so it stops sampling the air during shipment.
- Power down the device by holding the power button down until a confirmation screen appears asking if the user wants to turn off the device.

Button Temperature Sensors

- Peel off and throw away the foil tape. Return buttons to their spot in the briefcase.

Glass Tubes for Passive NO₂ Measurements

- Carefully unclip the glass tube from the mounting bracket.
- Put each glass tube into a plastic tube and seal the plastic tube with the white screw cap.
- Place each plastic tube into a plastic bag, seal it, and place the tube and bag into the briefcase.
- Do this for each tube, one at a time, to ensure there is no cross contamination between the tubes.
- Write down the date and time that you took down the plastic tubes on the form provided in your briefcase.
- Carefully remove the black plastic mounting brackets, so as not to damage any paint or wallpaper in your home, and put in the shipping box.



- The briefcase with measuring equipment must be placed into the cardboard box it was sent with.
- The box will be collected on **Friday 26 May**. You will receive an email from DHL confirming time and location for pick up – please follow the directions in the DHL email if you wish to rearrange to a different time or location. You will receive your incentive once the box has been returned to TNO.

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Thank you very much for your participation in this study. We greatly appreciate your cooperation and will be in touch to share your households' measurements with you.