

Camden Community Air Monitoring Guide



June 2017



Contents

Introduction	2
Background.....	2
Key air pollutants	3
Nitrogen dioxide	3
Diffusion tube monitoring	3
What is a diffusion tube?.....	3
How do they work?	4
Your monitoring kit.....	4
Monitoring tube installation	4
How to set up your monitoring tube (the day you start monitoring)	5
The results and what they mean	7
Contact details	7

Introduction

Improving air quality is a key priority for Camden. Exposure to poor air quality can have significant impacts on health and is linked to a number of conditions such as heart and lung diseases, cancer and asthma. This guide provides an overview of why monitoring air quality is important and a step-by-step guide of how to undertake diffusion tube monitoring.

Background

The current UK Air Quality Strategy (2007) contains a set of [national air quality objectives](#). If a local authority finds any areas where these objectives are unlikely to be achieved it must declare it an Air Quality Management Area (AQMA) and put together an action plan to improve the air quality. In 2000 the entirety of London Borough of Camden, along with many other London boroughs, was designated an AQMA for nitrogen dioxide (NO₂) and particulate matter (PM₁₀).



In 2016, we published [Camden's Air Quality Action Plan 2016-18](#), setting out our key priorities and actions to help tackle air pollution across the borough, which includes monitoring pollution levels.

Camden currently monitors air quality in hot spot areas across the borough. We cannot however monitor in all locations therefore the Camden Community Air Monitoring programme will help build a wider monitoring network, enabling communities to monitor in areas not already covered.

The locations will be mapped with our existing sites and results published on our air quality monitoring pages. This will help communities raise awareness of localised air pollution levels and how to tackle or avoid areas with high levels. The monitoring equipment provided are diffusion tube, which measure ambient levels of NO₂ in the air. If you would like more information on how we monitor air quality and the results, please visit www.camden.gov.uk/aqmon.

To find out more about the range of actions Camden is taking to improve air quality across the borough, visit www.camden.gov.uk/aq

Key air pollutants

The key air pollutants in Camden are NO₂ and particulate matters (mainly PM₁₀ and PM_{2.5}), and to a lesser extent sulphur dioxide (SO₂), ozone (O₃) and carbon monoxide (CO). These pollutants arise from road traffic, gas boilers, and other sources. Air pollution levels are monitored using a number of different instruments some basic, such as diffusion tubes and some complex, such as the fixed monitoring stations.

Nitrogen dioxide

As a participant of the Community Air Monitoring Programme, you will be measuring the levels of NO₂ present in the area you have chosen. NO₂ is produced when fossil fuels are combusted for purposes such as powering vehicles. The European Union legal limit for NO₂ is 40 micrograms per cubic metre of air (40µg/m³).

NO₂ is strongly linked with emphysema, bronchitis, and heart disease. Overloading of nitrogen has also been connected with the degradation of sensitive habitats and deteriorating biodiversity. It is therefore important the causes and effects of NO₂ production is understood and awareness is raised of ways to reduce exposure.

Diffusion tube monitoring

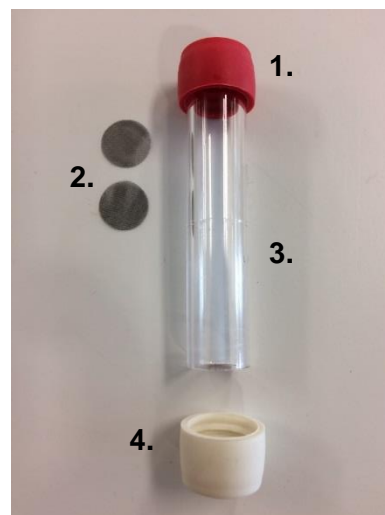
What is a diffusion tube?

A diffusion tube is a small acrylic cylinder consisting of two rubber caps and two internal mesh grids.

The mesh grids located at the closed (red) end of the tube are coated with a mix of chemicals called triethanolamine (TEA) and acetone.

The components are as follows:

1. End cap (must not be removed)
2. Mesh discs
3. Acrylic tube
4. Stopper (sealing) cap



How do they work?

Diffusion tubes measure the levels of NO₂ concentrations in the air. Once the white stopper cap is removed, the TEA and acetone mix on the mesh grids absorbs NO₂ from the surrounding air.

Your monitoring kit

The kit you will receive consists of two month's supply of diffusion tubes – one per site, per month – plus a holding clip, a washer and a cable tie.

1. Cable tie
2. Holding clip
3. Washer
4. Diffusion tube
5. Red and white stopper caps (Please do not remove caps other than when stated)
6. You will also receive a set of barcode stickers, a form to fill in and a small see-through bag to return the tubes.



Once you receive your kit, please place the tubes in a cool dark place, ideally a refrigerator, until you are ready to start monitoring.

Monitoring tube installation

It is important that you use the holding clip provided to secure your diffusion tube at your chosen site. This ensures the tube is secured away from any surfaces that may absorb NO₂, such as walls, which may obscure the results.

Suitable places to fix the holding clip are typically on lampposts or buildings or in a spot as close to the road as possible, where air can circulate freely (e.g. not inside a garden hedge).



Although the ideal level to place the tubes is breathing height (1.5 – 2m from ground level), there is a risk of theft or tampering, therefore any level between 2 – 4m from the ground is suitable. Your safety when placing the tubes is very important therefore we request you take this into consideration when siting your tube and ensure it is within arms-reach without the need to stand on anything or putting yourself or others at risk.

Your tube/s should also be sited away from the corner of buildings and no less than 10m away from any of the following external disturbances:

- heater flues (particularly low level balanced flues);
- Bushes or trees overhanging or surrounding the tube location;
- air conditioning outlets;
- extractor vents; or
- underground ventilation shafts.



The holding clip has a sticky section on the flat end that will fix it to the spot you want to measure. A cable tie is also provided to secure the clip in place, around objects such as posts or fences. The cable tie feeds through the end of the clip as shown in the photograph then connects at the other end.

Please note that once you have connected one end of the tie to the other you cannot undo it, so make sure you are certain it is where you want to monitor before fixing it together.

If you would like any advice or support on where to site your tube/s, please contact Frances Evans at the details provided at the end of this guide.

How to set up your monitoring tube (the day you start monitoring)

We request that you start monitoring on the date agreed, which will be on or near the 1st of the given month. This will ensure all project data is consistent with other air quality monitoring data collected across Camden.

On the day you start monitoring, check your holding clip is firmly secured, using the cable tie if required, and then follow the below steps:

1. Hold your diffusion tube so the red cap is at the top and white cap at the bottom.
2. Attach the washer by carefully pushing it over the top of the white stopper cap.
3. Push the washer to the red-capped end.
4. Place the tube into the holding clip. The washer will ensure it sits in the correct position.



1.



2.



3.



4.



5.



6.

5. Remove the white stopper cap.

Make sure you keep the cap in a safe place, as you will need it again to seal the tube at the end of the month's monitoring.

6. That's it! Leave the tube in place for 4 weeks (until end of the month).

When the 4 weeks monitoring is up, please follow the below steps:

7. Take the tube out of the holding clip and place the white sealing cap back on the end of the tube.

Keep the holding clip secured where it is, as you will be replacing the tube with a new one for the next month's monitoring.

8. Attach one of the barcode stickers provided on to the tube.
9. Attach the additional barcode sticker with the same number on to the recording sheet provided.



10. You then need to fill in row to the right of the barcode on the recording sheet.

- Attach the barcode (point 9. above)
- Add the location of the tube with the site number you have been provided and the street name (e.g. 1: Islip Street)
- Add the date you started the month's monitoring, numerically (e.g. 20.06.17)
- Add the date you finished the month's monitoring
- Add the number of hours the tube was exposed for over the 4-week period (this is usually around 672 hours).
- This box can be left blank unless there is anything the lab should know.

sampling data					
Barcode label (numerical order)	Location	Sampling		Exposure time (hours)	Other information
		Start date and time	Finish date and time		
a)	b)	c)	d)	e)	f)

11. Place the diffusion tube into the small sealable plastic bag supplied and store it in a cool dark place – a refrigerator is ideal – ensuring it is not exposed to any significant fluctuations in temperature.
12. Straight after you do this, put the new diffusion tube you were provided with into the holding clip, following steps 1 to 6 on page 5.

When the second month is complete, please follow steps 7 to 10 on page 6.

When this is done, you will need to put both diffusion tubes into the small plastic sealing bag, along with the recording sheet and return this to Camden straight away. You can either post the tubes (in a padded envelope) to the contact and address provided below, or deliver by hand to the offices at 5 Pancras Square (weekdays only). If you do wish to deliver by hand, please give a few days notice so we can ensure an officer is available to receive them as packages cannot be left at the reception. Camden will then send the tubes off to the laboratory for analysis and once the results are back, which can take 3-4 weeks, we will send these to you.

Before your month of monitoring is up, Camden will send out the next two-month's supply so you can get started on the next month's monitoring.

The results and what they mean

The laboratory will calculate the results from your tube/s and send these back to Camden, which we will forward on to you. The figure provided will show the micrograms of NO₂ per cubic metre of air (µg/m³). As you will recall from page 3, the EU legal limit is 40µg/m³. When looking at your results it is important to remember that diffusion tubes are not as accurate as those from very expensive real-time monitors, and they can have around a 15% margin of error above and below their final readings. We can help you interpret your results and compare them with data from elsewhere in the borough to help you make the most of your monitoring.

On very rare occasions, the result may return blank (null) which will be due to foreign objects (such as insects) or water droplets in the tube. This is an unfortunate drawback to this method of monitoring, however the benefits are this is a cheap, simple and accessible form of monitoring for local authorities and communities.

Contact details

We hope you enjoy taking part in this programme. If you have any queries, please contact Frances Evans: Frances.evans@camden.gov.uk or 020 7974 1473

To deliver/ collect diffusion tubes in person:

5 Pancras Square, London, N1C 4AG
(please go to reception who will contact the officer you have arranged delivery with)

Postal address

Frances Evans, Sustainability Officer, Town Hall, Judd Street, London, WC1H 9JE

For more detailed guidance on diffusion tubes and how to set them up, visit:
https://laqm.defra.gov.uk/documents/0802141004_NO2_WG_PracticalGuidance_Issue1a.pdf