

Standard operating procedure for sampling atmospheric particulate matter  
in view of the inter-comparison of organic and elemental carbon measurements  
(AQUILA 2011/2012)

Version	Authors	Reviewed	Approved	Date of approval
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Document history			
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1.0	19.05.2011	J.P. Putaud	First Draft
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## 1- PURPOSE

During the 16<sup>th</sup> AQUILA meeting in Ispra on 16-17 March 2011, it was agreed that an intercomparison for the determination of organic carbon (OC) and elemental carbon (EC) deposited on quartz fiber filters should be organised in the framework of AQUILA in 2011, and completed in 2012. As 8 AQUILA Partners volunteered to collect ambient samples on filters for this intercomparison, it appeared desirable to have a common standard operating procedure (SOP) for collecting, handling, storing and shipping the samples, to be applied at all sites.

## 2- SCOPE AND APPLICATION

This SOP provides instructions for ambient aerosol sample collection, handling, storage and shipment, in the frame of the AQUILA 2011/2012 inter-comparison of the measurements of OC and EC deposited on quartz fiber filters. This SOP is addressed to professionals who know and implement good laboratory practices.

## 3- SAFETY

All procedures must be conducted in full respect of the occupational health and safety guidelines and regulations in force at the place of work.

#### **4- DESCRIPTION OF THE METHOD**

Atmospheric samples are to be collected with high volume (Hi-Vol) samplers (flow rate 30 m<sup>3</sup>/h) equipped with a PM<sub>10</sub> or PM<sub>2.5</sub> sampling head over 150 mm diam. round quartz fiber filters. As the homogeneity of the deposit is essential for the success of the intercomparison, filter contamination before and after sampling should be carefully avoided. Filters should be stored in a cool and dry place after sampling, and be shipped no more than 15 days after sampling to the Joint Research Centre of the European Commission, Institute for Environment and Sustainability, Ispra site, Italy.

#### **5- DEFINITIONS**

n.a.

#### **6- EQUIPMENT AND CONSUMABLES**

##### **6.1. Equipment**

###### *6.1.1. Particulate matter Hi-Vol sampler*

The performance requirements of the sampling instrument are given in the European Reference Methods EN 12341 and 14907.

###### *6.1.2. Small laboratory devices*

- stainless steel or Teflon coated tweezers for sample handling

##### **6.2. Consumables**

###### *6.2.1. Quartz fiber filters*

Binder-free round quartz fiber filters (diam.=150 mm) must be used. It is advised NOT to use the first and last filters in the filter box. It is not necessary to anneal the filters before sampling.

###### *6.2.2. Other laboratory consumables*

- dust-free gloves
- organic-free aluminum foil

## 7- PROCEDURE

### 7.1 Sampling

#### 7.1.1. *Sample number, sampling time and duration*

For the purposes of this intercomparison, 2 samples should be collected by each volunteering AQUILA partner, preferably at the same site, within the end of September 2011. Sampling periods should not exceed 12 hr. The sampling duration should be such that filter loads do NOT exceed  $30 \mu\text{gC cm}^{-2}$ .

#### 7.1.2. *Site type*

The type of site where atmospheric particulate matter is to be collected has to belong to one of the categories below:

- rural background area
- suburban area
- urban background area

Roadside and industrial sites should be avoided.

Any kind of information that could help understanding the results of the intercomparison (e.g. desert dust outbreak, large sea salt content, construction / demolition in vicinity) should also be recorded.

#### 7.1.3. *Filter environment during sampling*

The filter temperature should be kept as close as possible to ambient conditions during sampling.

### 7.2 Handling

Filters have to be handled using dust-free gloves, with clean tweezers, away from contamination sources (e.g. cigarette smoke, solvent organic vapors, insects), when put in and taken out from the filter holder. They should never be laid on any surface from which they could be contaminated (e.g. laboratory bench).

### 7.3 Storage

- Filters should be kept no longer than 10 days in the field.
- After sampling, each filter should be wrapped UNFOLDED in a wax-free aluminum foil (commercial aluminum film should be baked at  $450^{\circ}\text{C}$  for 2 hours). The aluminum foil envelop containing the filter should be placed in a zip-sealed plastic bag or a Petri dish closed with Parafilm<sup>®</sup> or equivalent material.
- The place and date of sampling, the type of site, the aerosol fraction sampled ( $\text{PM}_{10}$  or  $\text{PM}_{2.5}$ ), and the air volume sampled, should be indicated with a permanent marker on the plastic bag or the Petri dish.
- Filters should be stored in a clean place at about  $5^{\circ}\text{C}$ , not longer than 15 days before shipping.

## 7.4 Shipping

The two filters should be shipped together - neither REFRIGERATED nor FROZEN - by express post or courier not later than 15 October 2011 to:

Kevin Douglas  
European Commission - Joint Research Centre  
Institute for Environment & Sustainability  
TP 290  
Via Fermi, 2749  
I-21027 Ispra (VA)

Email: [kevin.douglas@jrc.ec.europa.eu](mailto:kevin.douglas@jrc.ec.europa.eu)

Tel: ++39 0332 785743

Fax: ++39 0332 785704

It is advised to inform by email <fabrizia.cavalli@jrc.ec.europa.eu> and <kevin.douglas@jrc.ec.europa.eu> about the shipment of the filters, specifying if they were sent by post or courier, and, when available, the parcel tracking number.