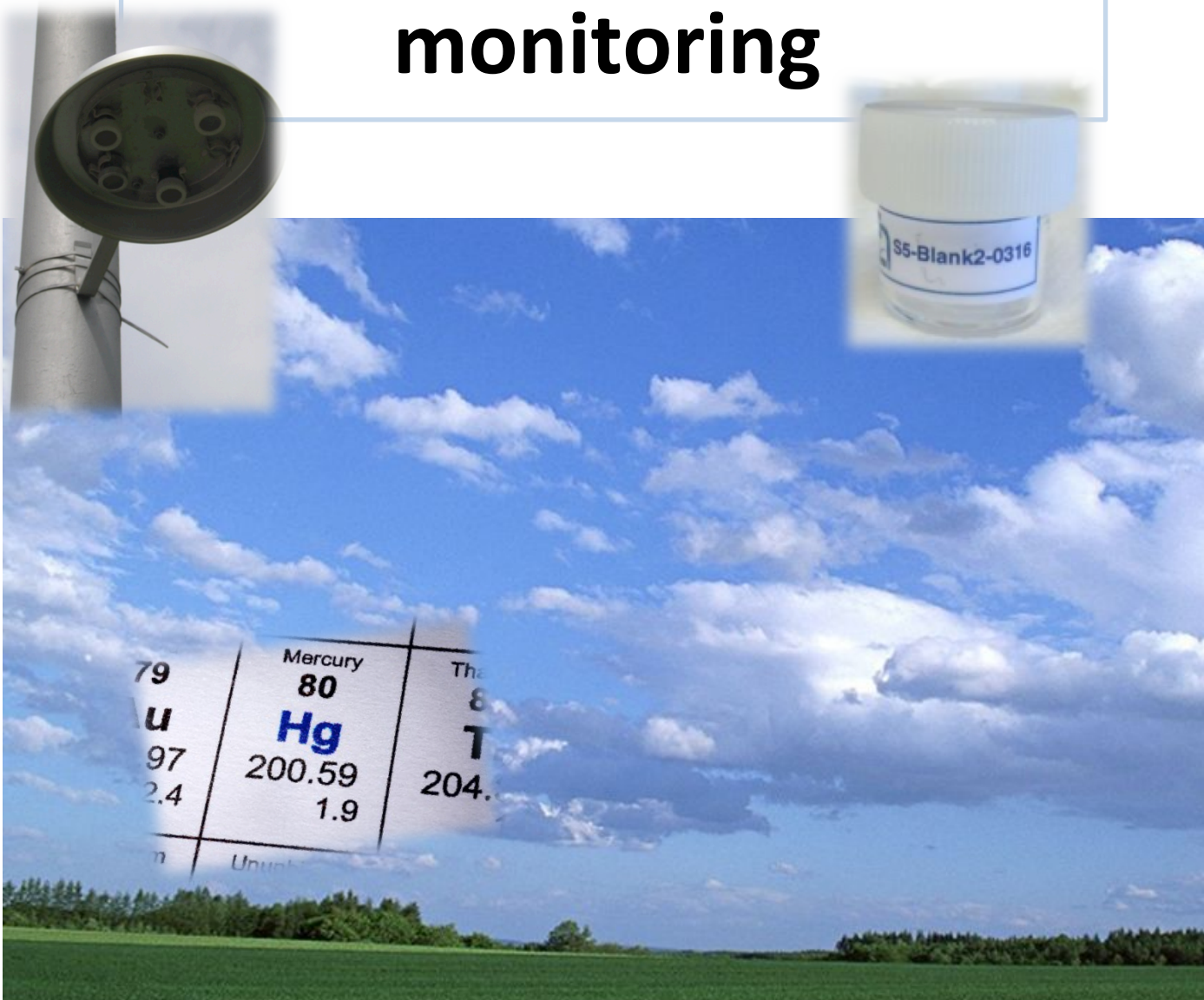




# Practical instructions to use IIA-CNR passive air samplers (PASs) for Hg monitoring



# Contents

## *Instructions*

- ✓ *Passive Sampling Materials.....pag.1*
- ✓ *Passive Air Samplers (PASs) .....pag.2*
- ✓ *STEP 1. Locating sampling sites .....pag.3*
- ✓ *STEP 2. Opening the vacuum bags & Substituting the caps  
.....pag.4*
- ✓ *STEP 3. Exposing the PASs & Filling in the Sampling Data Sheet  
.....pag.5*
- ✓ *STEP 4. Monitoring planning & Exposure Times .....pag.6*
- ✓ *STEP 5. Removing the PASs & Filling in the Sampling Data Sheet  
.....pag.7*
- ✓ *Removal, Packaging, Storage and Transportation .....pag.7*

# INSTRUCTIONS

## Passive Sampling Materials

Each box comprises **N. 1 shelter** and **N. 1 complete passive sampling set**.

**Each sampling set** includes **up to N. 6 bags**, labelled with sequential numbers, holding the samplers required for a 6-week monitoring campaign.

**\*\* Only for GMOS sites: Please note that a weekly sampling will be not carried out, thus the PASs named as A are not included within the bags.**

**Both N. 2 and N. 6 bags are not part of the related sampling set.**

- Specifically each bag contains a well defined couples of samplers individually kept under vacuum:
  - Bag 1:** N. 4 couples of under vacuum (u.v.) passive samplers (A1-A2, B1-B2, C1-C2, Blank 1-Blank2)
  - Bag 2:** N. 1 couple of u.v. passive samplers (A3-A4) \*\*
  - Bag 3:** N. 2 couple of u.v. passive samplers (A5-A6, B3-B4)
  - Bag 4:** N. 1 couple of u.v. passive samplers (A7-A8, C3-C4)
  - Bag 5:** N. 2 couple of u.v. passive samplers (A9-A10, B5-B6)
  - Bag 6:** N. 1 couple of u.v. passive samplers (A11-A12) \*\*

### the box content

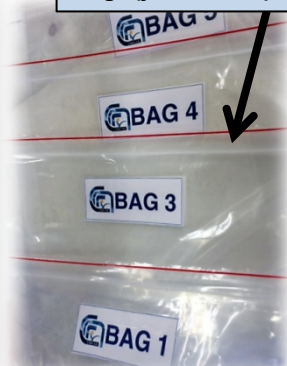
- ✓ N.1 PAS Sampling set
- ✓ N.1 Shelter
- ✓ Up to N.6 pairs of gloves
- ✓ N.3 plastic clamps



the starting bag (BAG 1)



Bags (from 1 to 6)



An under-vacuum passive sampler



## Passive Air Samplers (PASs)

Each passive sampler is kept in a vacuum bag and each vacuum bag comprises:

- **N.4 self-locking clear plastic bags;**
- **N.1 sealed glass vessel (PASs);**
- **N.1 open-cap mounting a diffusive barrier**

An alphanumeric code is reported onto each passive sampler for identifying, according to the following scheme:

**S2-C2-0316**

Specifically, **S2** is a tag related to the sampling site (named as S0, S1, S2, S3, S4, S5, S5, S6, S7, S8, S9 respectively).

**C** is a tag related to the exposure time:

- all the samples named as **A** will be kept exposed to the air for **1 week**;
- all the samples named as **B** will be exposed for **2 weeks** and finally
- all the samples named as **C** will be exposed for **3 weeks**.
- The samples named as Blank (1 and 2, respectively) will be kept exposed throughout the sampling campaign, but tightly closed.

The final 4 numbers (here reported as 0316) are related to the passive batch fabrication.

The number following the label C (i.e. C2) is a serial number related to the sequential sampling within the scheduled sampling procedure.

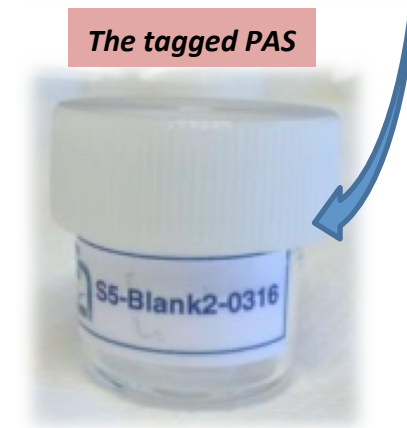
The monitoring procedure is clarified within the Table 1 following reported.



**The vacuum bag**



**The content of a vacuum bag**



**The tagged PAS**



## STEP 1. Locating sampling sites

Please, choose the proper place (according to Siting criteria Document – ANNEX 1) where the shelter with passive samplers will be exposed and then locate the shelter.

When a sampling site will be designed for Hg monitoring in air, **the shelter should be tied to a pole or a tree by plastic clamps about 2 meters high.**

After choosing the proper place for the sampling site, please fill in the Site survey (ANNEX 2).

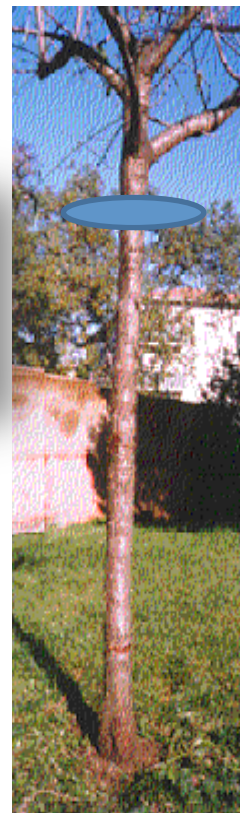
The shelter comprises N. 8 labelled seats to keep up to 8 PASs (A-A, B-B, C-C, and Blanks1 and 2).



### *The shelter placement*



*The shelter design*

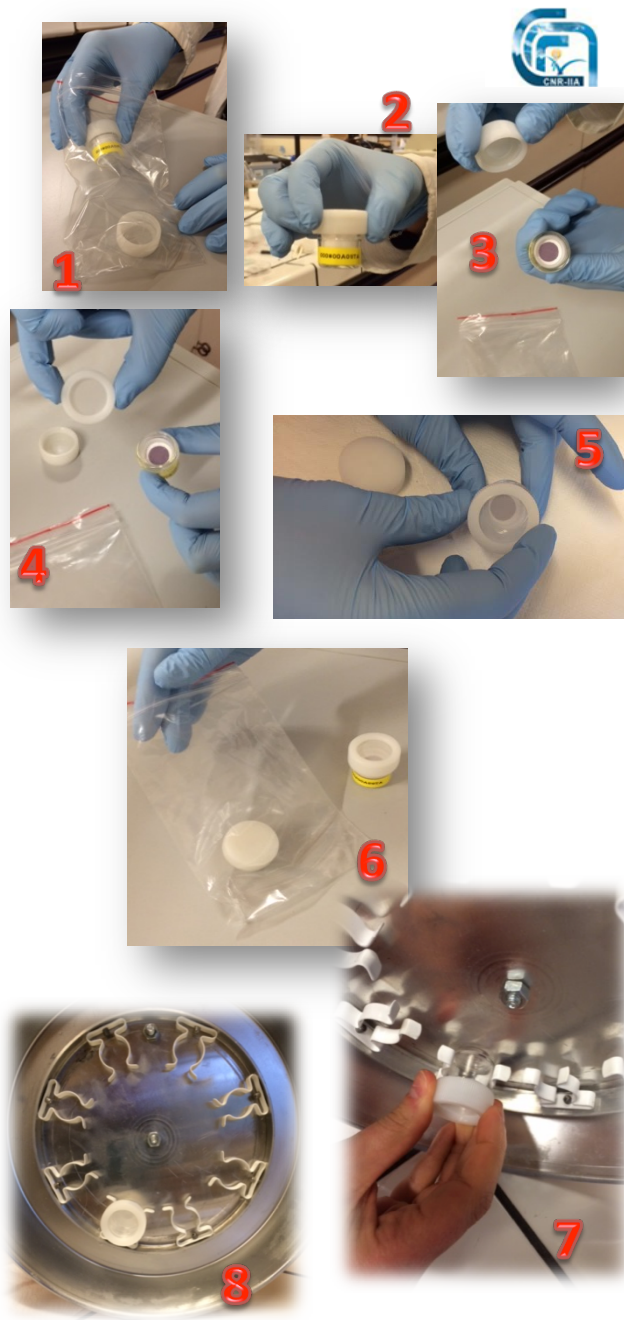


## STEP 2. Opening the vacuum bags & Substituting the cap

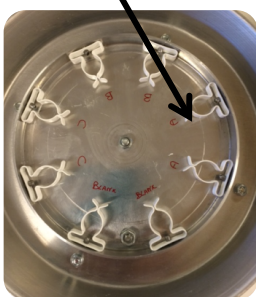
The content of each vacuum bag comprises N.4 self-locking clear plastic sachets, N.1 sealed glass vessel containing the passive film and N.1 diffusive-cap.

When you are ready for air sampling:

- 1) wear a pair of clean gloves picked up by a locked sachet (size L);
- 2) cut carefully the bag with scissors making sure not to cut the folded sachets placed inside;
- 3) remove the content and handle it with gloves (1);
- 4) unscrew the white cap of the glass vessel (2,3) and quickly screw the diffusive-cap (4,5);
- 5) immediately use one sachet to storage the unscrewed white cap, another one to keep both the remaining two sachets and the sachet with the cap, then close it (6);
- 6) Please, unscrew the white cap of each PAS when you are ready to start the campaign. Place it into the designated shelter seat, with the diffusive layer facing the air (i.e. the screw cap down) (7-8).



*The shelter seats*



## STEP 3. Exposing the PASs & Filling in the Sampling Data Sheet

7) Expose the PASs for the scheduled exposure time (see Table 1 – Step 4), and fill in the Sampling Data Sheet referred to your network (GMOS or WHO) (see ANNEX 3);

8) *Each sachet may be placed inside the respective coming bag that will be locked and then properly stored (please, choose a cool, dark and dry container).*

**Use gloves when handling samples; opening and closure of PAS samplers must be carried out as close as possible to the sampling sites (shelters); store caps immediately to prevent contamination.**



**SAMPLING DATA SHEET – EXAMPLE OF EXPOSURES OF PASs**

Campaign N. 1

Sampling Site Name: *Italy Monte Curcio*

Code of each passive sampler	Exposures start at: Start date [DD/MM/YYYY (Day/Month/Year)]	Exact Local Time [HH:MM]	Exposures stop at: End date [DD/MM/YYYY (Day/Month/Year)]	Exact Local Time [HH:MM]
S15-A1-0316	22/04/2016	10:30	29/04/2016	10:30
S15-A2-0316	22/04/2016	10:30	29/04/2016	10:30
S15-B1-0316	22/04/2016	10:30	06/05/2016	10:30
S15-B2-0316	22/04/2016	10:30	06/05/2016	10:30
S15-C1-0316	22/04/2016	10:30	13/05/2016	10:30
S15-C2-0316	22/04/2016	10:30	13/05/2016	10:30
S15-Blank1-0316	22/04/2016	10:30	03/06/2016	10:30
S15-Blank2-0316	22/04/2016	10:30	03/06/2016	10:30
S15-A3-0316	29/04/2016	10:30	06/05/2016	10:30
S15-A4-0316	29/04/2016	10:30	06/05/2016	10:30
S15-A5-0316	06/05/2016	10:30	13/05/2016	10:30
S15-A6-0316	06/05/2016	10:30	13/05/2016	10:30
S15-B3-0316	06/05/2016	10:30	20/05/2016	10:30
S15-B4-0316	06/05/2016	10:30	20/05/2016	10:30
S15-A7-0316	13/05/2016	10:30	03/06/2016	10:30
S15-A8-0316	13/05/2016	10:30	03/06/2016	10:30
S15-A9-0316	13/05/2016	10:30	27/05/2016	10:30
S15-A10-0316	20/05/2016	10:30	27/05/2016	10:30
S15-B5-0316	20/05/2016	10:30	03/06/2016	10:30
S15-B6-0316	27/05/2016	10:30	03/06/2016	10:30
S15-A11-0316	27/05/2016	10:30	03/06/2016	10:30
S15-A12-0316	27/05/2016	10:30	03/06/2016	10:30

Yellow: 1-week sampling; Light blue: 2-week sampling; Green: 3-week sampling

Name of Site Manager: .....

E-mail: .....



## STEP 4. Monitoring planning & Exposure Times



Where a weekly sampling will be not carried out, the PASs named as A are not included within the bags. Thus both N. 2 and N. 6 bags are not part of the related sampling set (**\*\* please note that this is referred only to GMOS sites**).

In fact all the samples named as A will be subjected to a 1-week exposure, meanwhile B and C ones will be exposed to air for 2 and a 3 weeks, respectively.

Specifically:

-Bag 1 comprises the complete starting sampling set to be housed onto the shelter on **the first day** of monitoring.

-After **1 week** (the eighth day) the couple of samples named A1 and A2 will be removed, sealed and replaced with A3-A4 from Bag (**\*\*step not to be followed at GMOS sites**).

-After **2 weeks** (the fifteenth day) both the couples A3-A4 and B1-B2 will be removed, sealed and replaced with A5-A6 and B3-B4 from Bag 3, respectively.

-After **3 weeks** (the twenty-second day) both the couples A5-A6 and C1-C2 will be removed, sealed and replaced with A7-A8 and C3-C4 from Bag 4, respectively.

-After **4 weeks** (the twenty-ninth day) both the couples A7-A8 and B3-B4 will be removed, sealed and replaced with A9-A10 and B5-b6 from Bag 5, respectively.

-After **5 weeks** (the thirty-sixth day) the couples A9-A10 will be removed, sealed and replaced with A11-A12 from Bag 6 (**\*\*step not to be followed at GMOS sites**).

-Finally, after **6 weeks** all the exposed passive samplers will be removed and sealed.

-Environmental parameters (like temperature, %RH, main wind direction..) should be daily reported on a suitable notepad and then joint to the samples at the end of monitoring, to be used for data analyses.

**Table 1**

	1-week	2-week	3-week	4-week	5-week	6-week
BAG1	A1-A2 B1-B2 C1-C2 Blanks1-2					
BAG2**		A3-A4				
BAG3			A5-A6 B3-B4			
BAG4				A7-A8 C3-C4		
BAG5					A9-A10 B5-B6	
BAG6**						A11-A12

## STEP 5. Removing the PASs & Filling in the Sampling Data Sheet

9) after each exposition, passive samplers will be removed and sealed with the own white cap coming from the stored bag and properly stored (**dry , dark and cool place**);

10) pack the sealed glass vessel in a sachet and lock it; pack it in a second sachet and lock it; pack it in a third sachet and lock it.

11) Put the diffusive-cap within the fourth bag and lock it too.

12) Depending on the planned exposure timing, replace the removed PAS with another one belonging to the same series (i.e. A with A, B with B and C with C) contained in the following sequential bag using the same care as previously described.



## Removal, Packaging, Storage and Transportation

