

VOC Passive Sampler

GABIE

The G.A.B.I.E badge (Gas Adsorbent Badges for Individual Exposure) is a passive sampler developed by INRS (French National Institute for Research and Safety), which allows simultaneous sampling of a multitude of organic gases and vapors, in order to determine the Average Exposure Values (TWA).

Principle

The volatile organic compounds (VOC) in the atmosphere are captured by diffusion at specific rate function of each substance and the badge's geometry. VOCs are trapped on an adsorbent material (activated charcoal) located in the bottom of the badge. The sampling begins as soon as the active charcoal is introduced into the badge and is attached in the workers's breathing zone.

At the end of the sampling, the charcoal is returned to the vial and sent quickly to the laboratory, which will desorb the pollutants, using a solvent and then analyze the resulting solution.

The reliability of the G.A.B.I.E. was the subject of many tests following a rigorous protocol complying with the criteria of the European standard EN 838 to guarantee its performances.

This protocol makes it possible to check the consistency of the sampling rates over a range of variation of the air velocity, the temperature, the relative humidity and the concentration of pollutants.



Main characteristics

- Sampling up to 175 types of VOCs, for which the activated charcoal method is used.
- B type sampler, in accordance with European standard EN 838.
- Ideal for occasional measurements or campaigns involving a lot of workers.
- Light and compact : the worker is not embarrassed in his activity.
- Assures a representative sampling of the individual exposure.
- Easy to use : it can be used anywhere.
- No need of maintenance and/or calibration.

Technical characteristics

Operating conditions

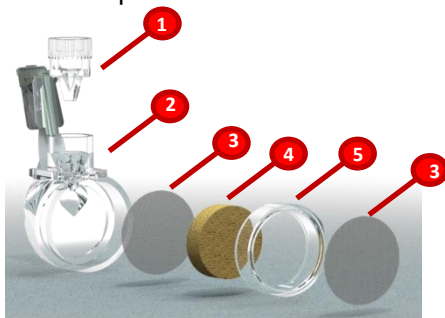
Temperature : 10-30°C

Relative humidity : 25-85%

Air velocity : from 0.1 to 1 m/s

Weight : 26 grammes

Dimensions : Ø 40 mm and h 65 mm



- 1 Cap
- 2 Body
- 3 Grid
- 4 Foam
- 5 Ring

Sampling stop cap

The cap of the G.A.B.I.E. badge makes it possible to stop a sample at any time, for a more or less long time, ranging from a few minutes to several hours.

Principle

The aim is to block all adsorption of volatile organic compounds (VOCs) into the atmosphere during downtime (operator break, work stoppage, distance from the pollution area, etc.).

Description

The cap is made of high-density polyethylene (HDPE), recyclable.



Alphabetical list of chemical substances compatible with the GABIE badge

Substances ⁰	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
Ethyl Acetate	B	39.1	(c)	141-78-6
Isoamyl Acetate	C	30.1		123-92-2
Isobutyl Acetate	C	32.4		110-19-0
Isopropyl Acetate	B	34.2	(c)	108-21-4
1-methoxy-2-propyl Acetate	C	31.5		108-65-6
2-Butoxyethyl acetate	C	27.7		112-07-2
2-Ethoxyethyl acetate	C	31.5		111-15-9
2-Methoxyethyl acetate	C	34.0		110-49-6
Benzyl acetate	C	29.4		140-11-4
Butyl acetate	B	32.5	(c) (e)	123-86-4
Methyl acetate	B	43.4	(c)	79-20-9
n-amyl acetate	C	30.1		628-63-7
n-propyl acetate	C	35.3		109-60-4
sec-Amyl acetate	C	30.1		626-38-0
sec-Butyl acetate	C	32.4		105-46-4
sec-Hexyl acetate	C	28.3		108-84-9
tert-Butyl acetate	C	32.4		540-88-5
Vinyl acetate	C	39.8		108-05-4
Acetone	A	47.0	(b)	67-64-1

Les spécifications techniques peuvent changer sans avertissement

Substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
Acetonitrile	C	58.7		75-05-8
Ethyl acrylate	C	35.9		140-88-5
2-hydroxyethyl acrylate	C	34.6		818-61-1
2-hydroxypropyl acrylate	C	31.9		999-61-1
Methyl acrylate	C	39.8		96-33-3
n-butyl acrylate	C	30.5		141-32-2
Ethyl alcohol	C	54.8		64-17-5
Furfuryl aldehyde	C	37.2		98-01-1
Benzene	A	43.9	(c) (b) (e)	71-43-2
Biphenyl	C	27.9		92-52-4
Bromochloromethane	C	42.8		74-97-5
Bromoethane	C	43.2		74-96-4
Bromoform (Tribromomethane)	C	35.0		75-25-2
Bromomethane (methyl Bromide)	C	50.1		74-83-9
Vinyl bromide	C	45.4		593-60-2
2-Butoxyethanol (Butylglycol)	C	32.0		111-76-2
γ-Butyrolactone	C	44.1		96-48-0
3-Carene	C	29.8		13466-78-9
1-Chloro-1,1-difluoroethane (F142b)	C	43.6		75-68-3
Chloro-2-propane (isopropyl chloride)	C	41.4		75-29-6
Chlorobenzene	C	35.6		108-90-7
2-Benzyl chloride	C	30.3		∅ ∅ ∅
Chlorodifluoromethane (F22)	C	50.6		75-45-6
Chloroethane (ethyl Chloride)	C	47.7		75-00-3
2-Chloroethanol	C	44.7		107-07-3
2-Benzyl chloride	C	30.3		∅ ∅ ∅

substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
Chloroform	B	40,6	(c)	67-66-3
Chloromethane	C	57,7 74-87-3		74-87-3
Chloropentafluoroethane	C	40,7		76-15-3
3-Allyl chloride	C	42,4		107-05-1
o-Chlorostyrene	C	30,8		2039-87-4
α-Benzyl Chloride	C	32,7		100-44-7
o-Chlorotoluene	C	32,7		95-49-8
Chlorotrifluoromethane	C	50,0		75-72-9
Vinyl chloride (Chloroethylene)	C	49,1		75-01-4
Cyclohexane	C	37,6		110-82-7
Cyclohexene	C	38,3		110-83-8
Cyclopentane	C	42,2		287-92-3
n-Decane	B	25,9	(c)	124-18-5
Desflurane	B	33,8	(c)	57041-67-5
Diacetone-alcohol (Hydroxy-4-méthyl-4-pentanone-2)	C	32,4		123-42-2
Dibromodifluoromethane	C	39,7		75-61-6
1,2-Dibromoethane	C	36,0		106-93-4
Dibromomethane	C	40,3		74-95-4
1,1-Dichloro-1-fluoroethane (F141b1)	C	40,1		1717-00-6
1,1-Dichloro-1-nitroethane	C	36,8		594-72-9
1,2-Dichlorobenzene	C	30,6		95-50-1
1,3-Dichlorobenzene	C	30,6		541-73-1
1,4-Dichlorobenzene	C	30,6		106-46-7
Dichlorodifluoromethane	C	44,6		75-71-8
1,1-Dichloroethane	C	40,9		75-34-3
1,2-Dichloroethane	C	40,9		107-06-2
1,1-Dichloroethene	C	41,8		75-35-4
1,2-Dichloroethylene	C	41,8		540-59-0
Dichlorofluoromethane (F21)	C	45,1		75-43-4

Substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
Dichloromethane (Methylene chloride)	B	42.4	(c) (e)	75-09-2
1,2-Dichloropropane	C	36.7		78-87-5
Dicyclopentadiene	C	30.6		77-73-6
Dimethyl Ketone	C	36.7		96-22-0
Diisobutyl ketone	B	26.1	(c)	108-83-8
Diisobutylene	C	29.8		170-39-1
1,2-Dimethylcyclohexane	C	29.8		583-57-3
1,4-Dioxane	C	39.0		123-91-1
Dipropyl Ketone(4-Heptanone)	C	31.0		123-19-3
1,3-Divinylbenzene	C	29.3		1321-74-0
Enfluran	B	33.6	(c)	13838-16-9
Epichlorohydrin	C	40.3		106-89-8
Dibutyl ether	C	28.6		142-96-1
Methyl tert-amyl ether	C	33.0		994-05-8
Methyl tert-butyl ether	C	33.0		637-92-3
methyl tertiary-butyl ether	C	36.1		1634-04-4
1-Ethoxypropan-2-ol	C	34.7		1569-02-4
2-Ethoxyethanol,	C	38.2	(e)	110-80-5
Ethylbenzene	B	33,9	(c) (e)	100-41-4
Ethylene glycol (vapor)	C	50,1		107-21-1
Ethyl formate	C	44,1		109-94-4
Methyl formate	C	51.8		107-31-3
Glycidol (2,3-Epoxy-1-propanol	C	44.1		556-52-5
Halothane	B	35.3	(c)	151-67-7
gamma-hexachlorocyclohexane (lindane, benzene hexachlorure)	C	25.0		58-89-9
n-Heptane	C	31.6		142-82-5
3-Heptanone (Ethylbutylketone)	C	31.0		106-35-4
2-Heptanone (Methyl-n-amylketone)	C	31.0		110-43-0
1-Heptene	C	32.0		592-76-7
Hexachlorobutadiene	C	26.6		87-68-3
Hexachloroethane	C	29.2		67-72-1
n-Hexane	B	34.1	(c)	110-54-3

Substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
2-Hexanone (Butylmethylketone)	C	33.5		591-78-6
Iodomethane	C	44.8		74-88-4
Isoflurane	B	33.8	(c)	26675-46-7
Isopentane (Methyl-2-butane)	C	37.8		78-78-4
Isophorone	C	29.4		78-59-1
2-Isopropoxyethanol (Propylglycol)	C	34.7		109-59-1
Isopropylbenzene (Cumene)	C	30.6		98-82-8
Limonene	C	28.3		138-86-3
Methylethylketone (MEK)	A	41.8	(c)	78-93-3
Ethyl Methacrylate	C	32.9		97-63-2
Methyl Methacrylate	C	35.9		80-62-6
1-Methoxy-2-propanol	C	38.2		107-98-2
2-Methoxyethanol	C	43.0		109-86-4
4-Methoxyphenol	C	33.5		150-76-5
3-(3-Methoxy)propoxy-1-propanol (Ethermonomethylique du dipropylene glycol)	C	29.0		107-98-2
5-Methyl-3-heptanone	C	29.0		541-85-5
Methyl-n-propylketone	C	36.7		107-87-9
Methylacrylonitrile	C	42.6		126-98-7
Methylal (Dimethoxymethane)	C	43.0		109-87-5
Methylcyclohexane	C	34.2		108-87-2
Methylisoamylketone (5-Méthyl-2-hexanone)	C	31.0		110-12-3
Methylisobutylketone	A	34.0	(c) (e)	108-10-1
Methyl isopropylketone (3-Methyl-2-butanone)	C	36.7		563-80-4
2-Methylpentane	C	34.3		107-83-5
Methylstyrene (vinyltoluene)	C	31.0		25013-15-4
Naphtalene	C	31,4		3173-72-6
Nitrobenzene	C	35,7		98-95-3
Nitroethane	C	47,5		79-24-3
n-Nonane	C	27,6		111-84-2
n-Octane	C	29.4		111-65-9
Allyl glycidyl ether	C	35.3		106-92-3
1,2-Dichloroethane	C	32.6		107-06-2
Diphenyl ether	C	27.4		101-84-8
Diisopropyloxide (Diisopropyl ether)	C	33.0		108-20-3
Diethyl ether	C	40.1		60-29-7
Diglicidyl ether	C	37.1		2238-07-5

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Substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
Glycidyl isopropyl ether	C	34.8		4016-14-2
Glycidyl phenyl ether	C	31.2		122-60-1
Mesityl oxide	C	34.0		141-79-7
Buthyl glycidyl ether	C	32.0		2426-08-6
Propylene oxide	C	54.1		75-56-9
n-Pentane	C	37.8		109-66-0
1-Pentene	C	38.6		109-67-1
α-Pinene	C	29.8		80-56-8
β-Pinene	C	29.8		127-91-3
Propylbenzene	C	30.6		103-65-1
Pyridine	C	42.4		110-86-1
Sevoflurane	B	31.7	(c)	28523-86-6
Styrene	B	37.1	(c) (e)	100-42-5
Carbon disulfide	C	50.5		75-15-0
4-ter-Tertibutyltoluene	B	26.7	(c)	98-51-1
1,1,2,2-Tetrabromoethane	C	29.0		79-27-6
Tetrabromomethane	C	31.5		79-27-6
Tetrachloroethylene	B	31.7	(c)	127-18-4
1,1,2,2-Tetrachlorodifluoroethane	C	32.6		76-12-0
1,1,1,2-Tetrachlorodifluoroethane (F112a)	C	32.7		76-11-9
1,1,2,2-Tetrachloroethane	C	33.5		79-34-5
Tetrachloromethane (Carbon Tetrachloride)	C	36.6		56-23-5
1,1,1,2-Tetrafluoroethane	C	45.9		811-97-2
Tetrahydro-1,2,3,4-naphtalene (Tetraline)	C	30.6		119-64-2
Tetrahydrofuran	C	45.6		109-99-9
Tetranitromethane	C	37.9		509-14-8
Toluene	B	36.6	(c) (e)	108-88-3
Tribromomethane	C	35.0		75-25-2
Trichloro-1,1,1-ethane	B	34.4	(c)	71-55-6
1,2,4-Trichlorobenzene	C	30.3		120-82-1
1,1,2-Trichloroethane	C	36.6		79-00-5
Trichloroethylene	B	37.7	(c) (e)	79-01-6
Trichlorofluoromethane (F113)	C	40.4		75-69-4

Les spécifications techniques peuvent changer sans avertissement

Substances	Level of assessment	Flow rate sampling (cm ³ /min) (Ves)	REMARKS	CAS* NUMBER
1,2,3-Trichloropropane	C	33.5		96-18-4
Trichlorotoluene	C	28.5		98-07-7
1,1,2-Trichlorotrifluoroethane (F 113)	C	34.9		76-13-1
1,2,3-Trimethylbenzene	C	30.6		526-73-8
1,3,5-Trimethylbenzene (Mesitylene)	C	30.6		108-67-8
1,2,4-Trimethylbenzene	C	30.6		95-63-6
2,4,6-Trinitrotoluene	C	28.9		118-96-7
m-Xylene	C	33.9	(b) (e)	108-38-3
o-Xylene	A	33.8	(b)	95-47-6
p-Xylene	C	33.9	(b) (e)	106-42-3
m & p-Xylene (mix)	A	33.9	(a) (e)	1330-20-7

A: In compliance with the level 1A of the standard EN 838 or equivalent.

B: In compliance with the level 1B of the standard EN 838 or equivalent.

C: Values calculated from estimated diffusion coefficients and experimental flow rates.

(a): according to the project of standard ISO/DIS 16200.

(b): according to the tests of the paragraph 7.12: the mechanical Resistance.

(c): without the tests of the paragraph 7.8.: Effects of the temperature and air humidity on the performances of the sampler.

(d): with the test on the influence of air humidity at constant temperature.

(e): tests compliant to the appendix C of the standard EN 838: 1995. Field tests - comparison by pairs.

The flows of sampling are expressed on the standard conditions.

* C.A.S.: Chemical Abstract Service