User guide for sampling and analysis of the Trichloramine on the air

SYCLOPE Electronique

Ordering code : VAT0000 & VAT0001

Rev : 2

General information :

SYCLOPE Electronique 2011® User guide of the 16/02/2011 Rev 2

Analysis kit for Trichloramine on the air

User guide for sampling and analysis of the Trichloramine on the air
(Ref : DOC0120)

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I. Composition of the cases

1) Composition of the "Triklorame" analysis case Ref : VAT0000

Reference	Qté	Designation	Id	Picture
PCC0001	1	Photometer	1	
SKC0000	1	Sampling pump from 500 to 4000 mL/min	2	
CHM0002	1	Adjustable pipette from 20 to 200 µL	3	
CHM0031	1	Calibrated pipette to 2,5 mL	4	
OUT2101	1	Filter clamp	5	
CHM0034	1	Chloride 51 & 52 reagents	6' et 6"	
SKC0001	1	Sampling pump charger/adapter	7	
CHM0039	1	Syringe 10 mL	8	
MEC1138	1	Cap lifter for cassette	9	
EPR0002	2	Test tubes	10	
KRD0003	1	Adapter kit pump/cassette	11	
SKC0005	1	Screwdriver for sampling pump	12	

2) Composition of the sampling consumables case Ref : VAT0001

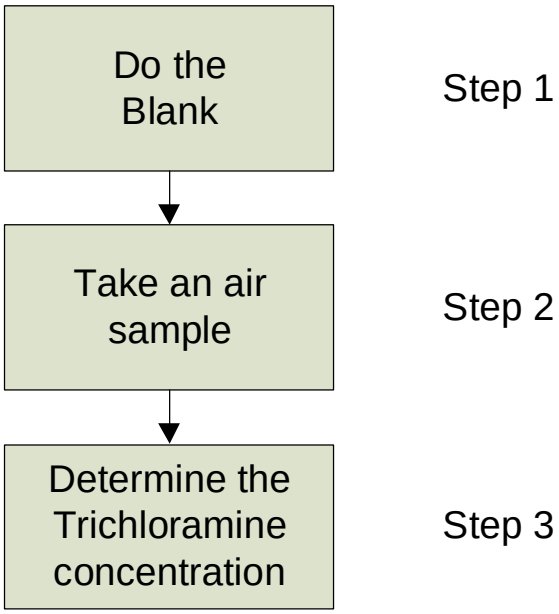
Qté	Designation	Id	Picture
20	Sampling cassette	A	
20	Syringe filter	B	
20	Coloration tube	C	
20	Filtration tube	D	
20	Desorption tube	E	
1	Dilution bottle 250 mL	F	
20	Syringe 5 mL	G	
40	Pipette tips 20-200 µL	H	
20	Pipette tips 5 mL	I	
1	Gloves	J	

To ensure the reliability of the measures, it is absolutely necessary to us only once the items of the VAT0001. Once an item is used, it is considered as contaminated and must not be use to perform a new analysis. It must be discarded.

Ensure that wastes are recycled according to your recycling standard.

II. Operating procedure to determine the Trichloramine concentration

This measuring tool allows you to measure the instantaneous value and the AEV during 8 hours (Average Exposure Value).
The procedure described bellow applies on the twice methodologies but some instructions of them are differents. The instructions concerning the AEV value will be indicated into brackets **[]**.



The method to determine the Trichloramine concentration use analysis and sampling knowledge. It is necessary to respect the procedure of this user guide.
Furthermore, it is necessary to respect the operating steps written in the « Technical support » to ensure the accuracy of the results.

Wearing gloves is necessary for the handling of the chemicals products used.

III. Step 1 : Do the blank of the photometer

This step should be done :

- When receiving a new sampling case VAT0001
- Every changing of methodology (Instantaneous or AEV)
- Every changing of the reagent kit

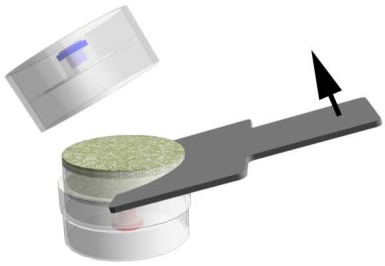
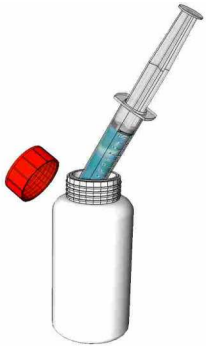
The zero or blank value is saved in the photometer memory. This value can be conserved during a analysis campaign up to 2 weeks. Over this period and to ensure the analysis accuracy, a new blank have to be done.

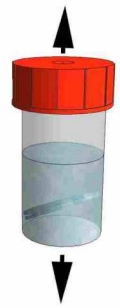
1) Materials required

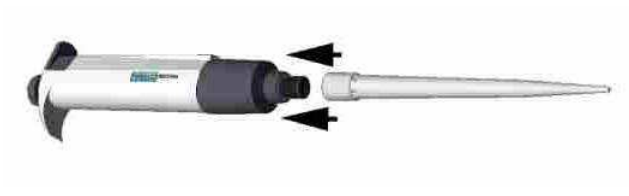
Id	Designation
1	Photometer
4	Calibrated pipette to 2,5 mL
3	Adjustable pipette from 20 to 200 µL
F	Dilution bottle
6’	Reagent chloride 51
6”	Reagent chloride 52
8	Syringe 10 mL
9	Cap lifter for cassettes
5	Filter clamp
J	Gloves
A	Sampling cassette
C	Coloration tube
B	Syringe filter
D	Filtration tube
H	Pipette tips 20-200 µL [x2]
I	Pipette tips 5 mL
G	Syringe 5 mL
E	Desorption tube
10	Test tubes

2) Method

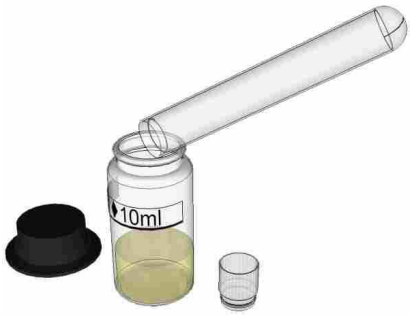
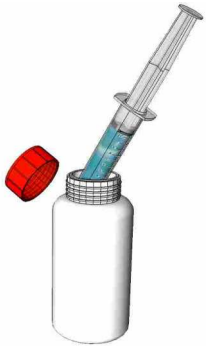
To do the blank of the photometer, the air sampling must not be done.

N°	Action	Picture
1	Open the desorption tube [E]	
2	Open the upper part (blue cap) of the cassette [A] *The lower part (red cap) is stick to avoid the error risk during opening*	
3	Take the two filters with the clamp [5]	
4	Put them in the desorption tube [E]	
5	Sample exactly 10 mL in the dilution bottler [F] with the syringe [8] *See technical support page 25*	

N°	Action	Picture
6	Inject the 10 mL sampled in the desorption tube [E] then close the cap of the tube	
7	Shake moderately the tube [E] during almost 30 seconds	
8	Sample 5 mL of solution in the tube [E] with the syringe [G] *See technical support page 25*	
9	Put the filter [B] on the syringe [G]	
10	Inject the solution by the filter [B] in the filtration tube [D]	

N°	Action	Picture
11	Put the tip [I] on the calibrated pipette [4]	
12	Sample 2,5 mL in the tube [D] *See technical support page 25*	
13	Inject the 2,5 mL sampled in the coloration tube [C]	
14	Set the volume of the adjustable pipette [3] to 200 µL	
15	Put the tip [H] on the adjustable pipette [3]	

N°	Action	Picture
16	Sample 200 µL of chloride 51 reagent [6'] Be sure that the reagent is not over the expiration date *See technical support page 25*	
17	Inject the 200 µL of reagent in the coloration tube [C] *See technical support page 25*	
18	Remove the tip [H] of the pipette [3] *Do not use this tip anymore*	
19	Set the volume of the adjustable pipette [3] to 150 µL	
20	Put a new tip [H] on the adjustable pipette [3]	

N°	Action	Picture
21	Sample 150 µL of chloride 52 reagent [6"] <u>Be sure that the reagent is not over the expiration date</u> *See technical support page 25*	
22	Inject the 150 µL of reagent in the coloration tube [C] *See technical support page 25*	
23	Close the coloration tube [C] then shake it during 30 seconds	
24	Transfer the solution of the coloration tube [C] in the test tube [10] *Be careful, a small degassing is possible during the opening of the tube*	
25	Sample exactly 2,5 mL in the dilution bottle [F] with the syringe [8] **[**For the AEV measure, sample 7,5 mL of solution**]** *See technical support page 25*	

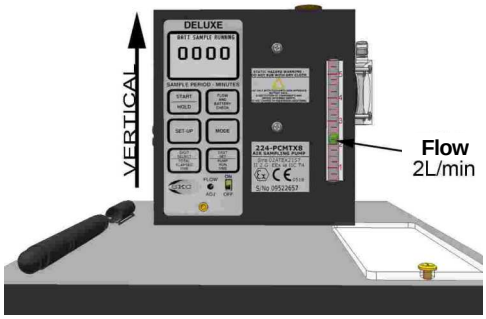
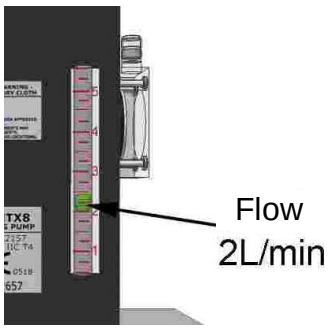
N°	Action	Picture
26	Inject the les 2,5 mL sampled in the test tube [10] then close it **[**For the AEV measure, inject the 7,5 mL sampled in the test tube**]**	
27	Shake the test tube [10] to mix the solution	
28	Put the test tube [10] in the photometer [1]	
29	Switch on the photometer [1]	
30	Do the blank by pressing the left button *The photometer must display 0.00 %T*	

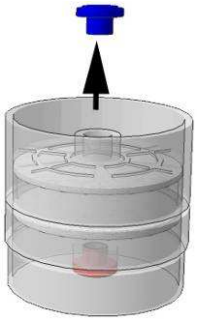
IV. Step 2 : Take an air sample

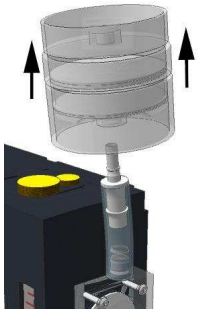
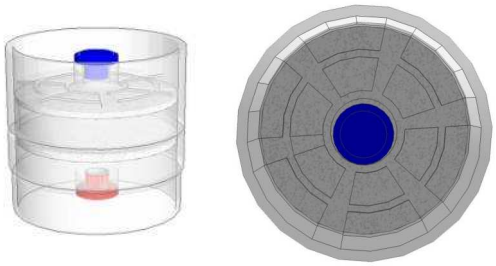
1) Material required

Id	Designation
2	Sampling pump from 5 to 4000 mL/min
11	Adapter kit pump/cassette
A	Sampling cassette
12	Screwdriver for sampling pump

2) Method

N°	Action	Picture
1	Unscrew the glass of the sampling pump [2] with the screwdriver [12]	
2	Install the pump [2] vertically on a flat support then switch on the pump with the On/Off switch *Be careful, the pump launch the sampling directly after switching on*	
3	Check the sampling flow of the pump [2] is at 2 L/Min. This operation is done in the factory but it must be checked before any sampling. *See the technical support page 25 to correct the sampling flow if necessary*	
4	Press the button START/HOLD to stand by the sampling cycle.	

N°	Action	Picture
5	Put the adapter kit [11] on the sampling plug of the pump [2]	
6	Remove the blue cap of the sampling cassette [A]	
7	Plug the cassette [A] on the adapter kit [11]	
8	Remove the red cap of the sampling cassette [A]	
9	Install the pump in the area to measure	
10	Press the button SET-UP to program the pump *It displays "DELAYED STARTED"* Set a time in minutes if you want to delay the sampling of x minutes *Use the buttons DIGIT SELECT and DIGIT SET to increase or decrease the value or to change the digit to set*	

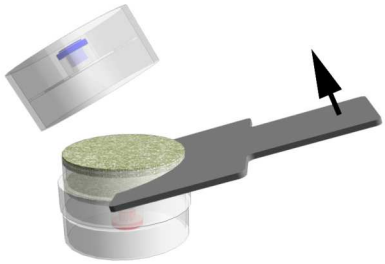
N°	Action	Picture
11	Press the button MODE *It displays "SAMPLE PERIOD"* Set the sampling duration between 45 and 75 Min *Use the buttons DIGIT SELECT and DIGIT SET to increase or decrease the value or to change the digit to set* **[**For the AEV measure, set the sampling duration on 8h (480 Min)**]** **[**For a such sampling duration, ensure that the battery pump is full loaded or connected to the supply network**]**	
12	Press the button START/STOP to start the sampling cycle *Wait the end of the sampling. The pump stops alone when the time is over.*	
13	Remove the cassette [A] from the adapter kit [11]	
14	Put the red and blue caps on the cassette [A] The blue cap on the draw side *It is possible to conserve the sampling during 2-3 days before to perform the analysis if the two caps are closed in a good way.*	

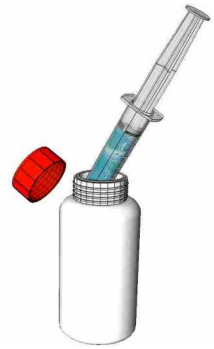
V. Step 3 : Determine the concentration of the Trichloramine

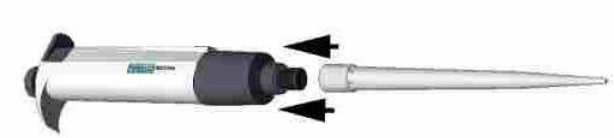
1) Material required

Id	Designation
1	Photometer
4	Calibrated pipette to 2,5 mL
3	Adjustable pipette from 20 to 200 µL
F	Dilution bottle
6'	Reagent chloride 51
6"	Reagent chloride 52
8	Syringe 10 mL
9	Cap lifter for cassettes
5	Filter clamp
J	Gloves
A	Sampling cassette
C	Coloration tube
B	Syringe filter
D	Filtration tube
H	Pipette tips 20-200 µL [x2]
I	Pipette tips 5 mL
G	Syringe 5 mL
E	Desorption tube
10	Test tubes

2) Method

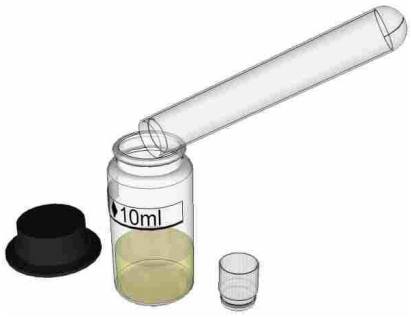
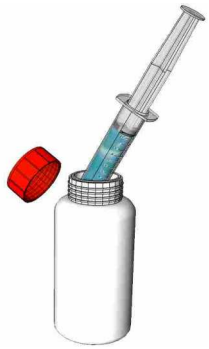
N°	Action	Picture
1	Open the desorption tube [E]	
2	Open the upper part (blue cap) of the cassette [A] *The lower part (red cap) is stick to avoid the error risk during opening*	
3	Take the two filters with the clamp [5]	

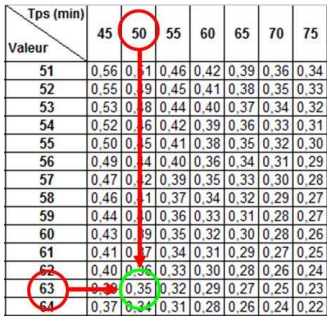
N°	Action	Picture
4	Put them in the desorption tube [E]	
5	Sample exactly 10 mL in the dilution bottler [F] with the syringe [8] *See technical support page 25*	
6	Inject the 10 mL sampled in the desorption tube [E] then close the cap of the tube	
7	Shake moderately the tube [E] during almost 30 seconds	
8	Sample 5 mL of solution in the tube [E] with the syringe [G] *See technical support page 25*	

N°	Action	Picture
9	Put the filter [B] on the syringe [G]	
10	Inject the solution by the filter [B] in the filtration tube [D]	
11	Put the tip [I] on the calibrated pipette [4]	
12	Sample 2,5 mL in the tube [D] *See technical support page 25*	
13	Inject the 2,5 mL sampled in the coloration tube [C]	

N°	Action	Picture
14	Set the volume of the adjustable pipette [3] to 200 µL	
15	Put the tip [H] on the adjustable pipette [3]	
16	Sample 200 µL of chloride 51 reagent [6'] <u>Be sure that the reagent is not over the expiration date</u> *See technical support page 25*	
17	Inject the 200 µL of reagent in the coloration tube [C] *See technical support page 25*	
18	Remove the tip [H] of the pipette [3] *Do not use this tip anymore*	

N°	Action	Picture
19	Set the volume of the adjustable pipette [3] to 150 µL	
20	Put a new tip [H] on the adjustable pipette [3]	
21	Sample 150 µL of chloride 52 reagent [6"] <u>Be sure that the reagent is not over the expiration date</u> *See technical support page 25*	
22	Inject the 150 µL of reagent in the coloration tube [C] *See technical support page 25*	
23	Close the coloration tube [C] then shake it during 30 seconds	

N°	Action	Picture
24	Transfer the solution of the coloration tube [C] in the test tube [10] *Be careful, a small degassing is possible during the opening of the tube*	
25	Sample exactly 2,5 mL in the dilution bottle [F] with the syringe [8] **[**For the AEV measure, sample 7,5 mL of solution**]** *See technical support page 25*	
26	Inject the les 2,5 mL sampled in the test tube [10] then close it **[**For the AEV measure, inject the 7,5 mL sampled in the test tube**]**	
27	Shake the test tube [10] to mix the solution	
28	Put the test tube [10] in the photometer [1]	

N°	Action	Picture
29	Switch on the photometer [1]	
30	Analyse the sample pressing the right button	
31	Determine the air Trichloramine value using the abacus on the next page *Sampling duration : 50 min* *Value displayed : 63,5 %T* *Trichloramine concentration = 0,35 mg/m³*	

Tps (min) / Valeur	45	50	55	60	65	70	75
51	0,56	0,51	0,46	0,42	0,39	0,36	0,34
52	0,55	0,49	0,45	0,41	0,38	0,35	0,33
53	0,53	0,48	0,44	0,40	0,37	0,34	0,32
54	0,52	0,46	0,42	0,39	0,36	0,33	0,31
55	0,50	0,45	0,41	0,38	0,35	0,32	0,30
56	0,49	0,44	0,40	0,36	0,34	0,31	0,29
57	0,47	0,42	0,39	0,35	0,33	0,30	0,28
58	0,46	0,41	0,37	0,34	0,32	0,29	0,27
59	0,44	0,40	0,36	0,33	0,31	0,28	0,27
60	0,43	0,39	0,35	0,32	0,30	0,28	0,26
61	0,41	0,37	0,34	0,31	0,29	0,27	0,25
62	0,40	0,36	0,33	0,30	0,28	0,26	0,24
63	0,39	0,35	0,32	0,29	0,27	0,25	0,23
64	0,37	0,34	0,31	0,28	0,26	0,24	0,22

Abacus for an instantaneous measure :

Tps (min) / Valeur	45	50	55	60	65	70	75	Tps (min) / Valeur	45	50	55	60	65	70	75
1	3,86	3,47	3,16	2,89	2,67	2,48	2,32	**51**	0,56	0,51	0,46	0,42	0,39	0,36	0,34
2	3,28	2,95	2,68	2,46	2,27	2,11	1,97	**52**	0,55	0,49	0,45	0,41	0,38	0,35	0,33
3	2,94	2,64	2,40	2,20	2,03	1,89	1,76	**53**	0,53	0,48	0,44	0,40	0,37	0,34	0,32
4	2,70	2,43	2,21	2,02	1,87	1,73	1,62	**54**	0,52	0,46	0,42	0,39	0,36	0,33	0,31
5	2,51	2,26	2,05	1,88	1,74	1,61	1,51	**55**	0,50	0,45	0,41	0,38	0,35	0,32	0,30
6	2,36	2,12	1,93	1,77	1,63	1,52	1,41	**56**	0,49	0,44	0,40	0,36	0,34	0,31	0,29
7	2,23	2,01	1,82	1,67	1,54	1,43	1,34	**57**	0,47	0,42	0,39	0,35	0,33	0,30	0,28
8	2,12	1,90	1,73	1,59	1,47	1,36	1,27	**58**	0,46	0,41	0,37	0,34	0,32	0,29	0,27
9	2,02	1,82	1,65	1,51	1,40	1,30	1,21	**59**	0,44	0,40	0,36	0,33	0,31	0,28	0,27
10	1,93	1,74	1,58	1,45	1,34	1,24	1,16	**60**	0,43	0,39	0,35	0,32	0,30	0,28	0,26
11	1,85	1,66	1,51	1,39	1,28	1,19	1,11	**61**	0,41	0,37	0,34	0,31	0,29	0,27	0,25
12	1,78	1,60	1,45	1,33	1,23	1,14	1,07	**62**	0,40	0,36	0,33	0,30	0,28	0,26	0,24
13	1,71	1,54	1,40	1,28	1,18	1,10	1,03	**63**	0,39	0,35	0,32	0,29	0,27	0,25	0,23
14	1,65	1,48	1,35	1,24	1,14	1,06	0,99	**64**	0,37	0,34	0,31	0,28	0,26	0,24	0,22
15	1,59	1,43	1,30	1,19	1,10	1,02	0,95	**65**	0,36	0,32	0,30	0,27	0,25	0,23	0,22
16	1,54	1,38	1,26	1,15	1,06	0,99	0,92	**66**	0,35	0,31	0,28	0,26	0,24	0,22	0,21
17	1,48	1,34	1,21	1,11	1,03	0,95	0,89	**67**	0,34	0,30	0,27	0,25	0,23	0,22	0,20
18	1,44	1,29	1,18	1,08	0,99	0,92	0,86	**68**	0,32	0,29	0,26	0,24	0,22	0,21	0,19
19	1,39	1,25	1,14	1,04	0,96	0,89	0,83	**69**	0,31	0,28	0,25	0,23	0,22	0,20	0,19
20	1,35	1,21	1,10	1,01	0,93	0,87	0,81	**70**	0,30	0,27	0,24	0,22	0,21	0,19	0,18
21	1,31	1,18	1,07	0,98	0,91	0,84	0,78	**71**	0,29	0,26	0,23	0,22	0,20	0,18	0,17
22	1,27	1,14	1,04	0,95	0,88	0,82	0,76	**72**	0,28	0,25	0,23	0,21	0,19	0,18	0,17
23	1,23	1,11	1,01	0,92	0,85	0,79	0,74	**73**	0,26	0,24	0,22	0,20	0,18	0,17	0,16
24	1,20	1,08	0,98	0,90	0,83	0,77	0,72	**74**	0,25	0,23	0,21	0,19	0,17	0,16	0,15
25	1,16	1,05	0,95	0,87	0,80	0,75	0,70	**75**	0,24	0,22	0,20	0,18	0,17	0,15	0,14
26	1,13	1,02	0,92	0,85	0,78	0,73	0,68	**76**	0,23	0,21	0,19	0,17	0,16	0,15	0,14
27	1,10	0,99	0,90	0,82	0,76	0,71	0,66	**77**	0,22	0,20	0,18	0,16	0,15	0,14	0,13
28	1,07	0,96	0,87	0,80	0,74	0,69	0,64	**78**	0,21	0,19	0,17	0,16	0,14	0,13	0,12
29	1,04	0,93	0,85	0,78	0,72	0,67	0,62	**79**	0,20	0,18	0,16	0,15	0,14	0,13	0,12
30	1,01	0,91	0,83	0,76	0,70	0,65	0,61	**80**	0,19	0,17	0,15	0,14	0,13	0,12	0,11
31	0,98	0,88	0,80	0,74	0,68	0,63	0,59	**81**	0,18	0,16	0,14	0,13	0,12	0,11	0,11
32	0,95	0,86	0,78	0,72	0,66	0,61	0,57	**82**	0,17	0,15	0,14	0,12	0,12	0,11	0,10
33	0,93	0,84	0,76	0,70	0,64	0,60	0,56	**83**	0,16	0,14	0,13	0,12	0,11	0,10	0,09
34	0,90	0,81	0,74	0,68	0,63	0,58	0,54	**84**	0,15	0,13	0,12	0,11	0,10	0,09	0,09
35	0,88	0,79	0,72	0,66	0,61	0,57	0,53	**85**	0,14	0,12	0,11	0,10	0,09	0,09	0,08
36	0,86	0,77	0,70	0,64	0,59	0,55	0,51	**86**	0,13	0,11	0,10	0,09	0,09	0,08	0,08
37	0,83	0,75	0,68	0,62	0,58	0,54	0,50	**87**	0,12	0,11	0,10	0,09	0,08	0,08	0,07
38	0,81	0,73	0,66	0,61	0,56	0,52	0,49	**88**	0,11	0,10	0,09	0,08	0,07	0,07	0,06
39	0,79	0,71	0,65	0,59	0,55	0,51	0,47	**89**	0,10	0,09	0,08	0,07	0,07	0,06	0,06
40	0,77	0,69	0,63	0,58	0,53	0,49	0,46	**90**	0,09	0,08	0,07	0,07	0,06	0,06	0,05
41	0,75	0,67	0,61	0,56	0,52	0,48	0,45	**91**	0,08	0,07	0,06	0,06	0,05	0,05	0,05
42	0,73	0,65	0,59	0,55	0,50	0,47	0,44	**92**	0,07	0,06	0,06	0,05	0,05	0,04	0,04
43	0,71	0,64	0,58	0,53	0,49	0,45	0,42	**93**	0,06	0,05	0,05	0,05	0,04	0,04	0,04
44	0,69	0,62	0,56	0,52	0,48	0,44	0,41	**94**	0,05	0,05	0,04	0,04	0,04	0,03	0,03
45	0,67	0,60	0,55	0,50	0,46	0,43	0,40	**95**	0,04	0,04	0,04	0,03	0,03	0,03	0,03
46	0,65	0,59	0,53	0,49	0,45	0,42	0,39	**96**	0,03	0,03	0,03	0,03	0,02	0,02	0,02
47	0,63	0,57	0,52	0,47	0,44	0,41	0,38	**97**	0,03	0,02	0,02	0,02	0,02	0,02	0,02
48	0,62	0,55	0,50	0,46	0,43	0,40	0,37	**98**	0,02	0,02	0,01	0,01	0,01	0,01	0,01
49	0,60	0,54	0,49	0,45	0,41	0,38	0,36	**99**	0,01	0,01	0,01	0,01	0,01	0,01	0,01
50	0,58	0,52	0,48	0,44	0,40	0,37	0,35	**100**	0,00	0,00	0,00	0,00	0,00	0,00	0,00

For any other value, contact the technical department of SYCLOPE Electronique

Value (%T) : value displayed by the photometer
Tps (min) : sampling duration set on the pump
Result : Trichloramine value on the air at the sampling point in mg/m^3

Abacus for the AEV measure :

Tps (min) / Valeur	480	Tps (min) / Valeur	480
1	0,72	51	0,11
2	0,61	52	0,10
3	0,55	53	0,10
4	0,51	54	0,10
5	0,47	55	0,09
6	0,44	56	0,09
7	0,42	57	0,09
8	0,40	58	0,09
9	0,38	59	0,08
10	0,36	60	0,08
11	0,35	61	0,08
12	0,33	62	0,08
13	0,32	63	0,07
14	0,31	64	0,07
15	0,30	65	0,07
16	0,29	66	0,07
17	0,28	67	0,06
18	0,27	68	0,06
19	0,26	69	0,06
20	0,25	70	0,06
21	0,25	71	0,05
22	0,24	72	0,05
23	0,23	73	0,05
24	0,22	74	0,05
25	0,22	75	0,05
26	0,21	76	0,04
27	0,21	77	0,04
28	0,20	78	0,04
29	0,19	79	0,04
30	0,19	80	0,04
31	0,18	81	0,03
32	0,18	82	0,03
33	0,17	83	0,03
34	0,17	84	0,03
35	0,16	85	0,03
36	0,16	86	0,02
37	0,16	87	0,02
38	0,15	88	0,02
39	0,15	89	0,02
40	0,14	90	0,02
41	0,14	91	0,01
42	0,14	92	0,01
43	0,13	93	0,01
44	0,13	94	0,01
45	0,13	95	0,01
46	0,12	96	0,01
47	0,12	97	0,00
48	0,12	98	0,00
49	0,11	99	0,00
50	0,11	100	0,00

For any other value, contact the technical department of SYCLOPE Electronique

Value (%T) : value displayed by the photometer
Tps (min) : sampling duration set on the pump
Result : Trichloramine value on the air at the sampling point in mg/m^3

VI. Technical support

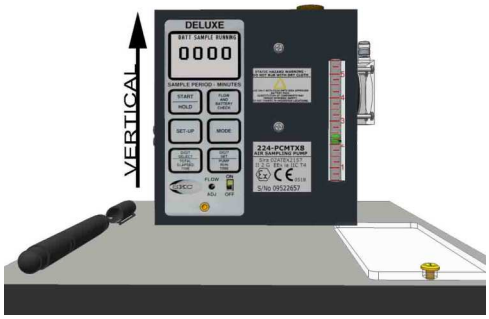
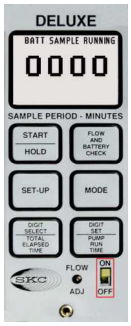
1) Sampling technical with an automatic pipette

N°	Action	Picture
1	Without pressing, the piston of the pipette is at his higher level	
2	Eject the air of the tip pressing the piston at his first step then hold this position	
3	Dip the pipette in the liquid to sample keeping the first step position	
4	Release the piston to sample the liquid following the volume set	
5	Press the piston to his lower position to inject the sampled volume	

2) Sampling technical with the 10 mL syringe

N°	Action	Picture
1	Sample a little bit more of the volume you want to inject	
2	Put the syringe to a vertical position	
3	Eject the residual air volume in the top of the syringe	
4	Eject the surplus volume of liquid by positioning the lower level of the piston to the required volume mark	
5	Press completely the piston to his final position to inject the calibrated volume	

3) Setting of the air flow

N°	Action	Picture
1	Unscrew the glass of the sampling pump using the screwdriver [11]	
2	Install the pump [2] vertically on a flat support	
3	Switch on the pump with the On/Off switch *Be careful, the pump launch the sampling directly after switching on*	
4	Set the air flow to 2 L/Min using the screwdriver [11]	
5	Set the air flow to 2 L/Min	

General information :

SYCLOPE Electronique 2009® User guide of the 13/05/2009 Rev 1

Analysis kit for Trichloramine on the air

User guide for sampling and analysis of the Trichloramine on the air
(Ref : DOC0120)

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