

# Pool Air Quality Management Annual Service Contract

To meet the challenges of health and energy efficiency in swimming pools, Octopus Lab and Ethern have developed a **complete solution, Swim air Vision®**, allowing :

- **Continuously monitor the air quality of swimming pools** (NCl<sub>3</sub>, CO<sub>2</sub>, T, HR) with a measurement of trichloramine **validated by the CSTB**
- **Visualize the indoor air quality data measured** and to come on a web interface
- Access to **indoor air quality reports**
- **Be alerted** by email when limit values are exceeded
- **Regulate the ventilation** in an intelligent way, by anticipation
- **Optimize energy consumption**

**You can act manually or automatically** to ensure that your staff and swimmers are safe to use. With automatic reports, **communicate with your customers and lifeguards**, who are often concerned about the potential health effects of trichloramine.

Finally, thanks to this monitoring and indoor air quality forecasts, you can benefit from **intelligent control of your ventilation in order to guarantee good air quality at all times** while **optimizing energy consumption**, the main expense of aquatic activity establishments.

## Why measure trichloramine?

Trichloramine is the cause of the characteristic "chlorine" smell in swimming pools.

This molecule is created by the reaction between the chlorine used to disinfect the water and the organic matter brought by swimmers. (sweat, cosmetics, saliva, urine, dead skin...).

It is a highly volatile gas that can cause eye, skin and respiratory irritation, and even asthma and rhinitis in case of prolonged exposure. Therefore, swimming pool employees (especially lifeguards) are particularly exposed.

Asthma and rhinitis are recognized in France as occupational diseases by the decree 2003-110 of 02/11/2003.

## Is the measure mandatory?

When employees are exposed to chemical risks, the employer is required by articles L.4121-1 and L.4121-2 of the French Labour Code to assess, eliminate or reduce the identified risks and to inform and train its employees.

In a pool treated with chlorine the risk of generating trichloramine still exists. The above precautionary principles must therefore be applied.

Measurements of trichloramine allow to quantify the concentrations. This helps to set up a strategy to maintain a level below 0.3 mg/m<sup>3</sup> recommended by the Anses (National Agency for Food, Environmental and Occupational Health Safety).

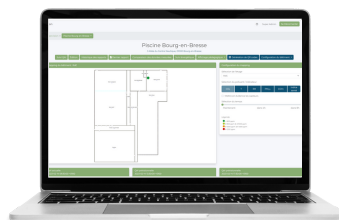
## Content of the offer



### NEMo XT TC station:

Parameters : Trichloramine, CO<sub>2</sub>, Temperature, Humidity

IoT Connection: LTE-Cat M1 or NBIoT (2G optional)



### Software solution Swim'Air Vision® :

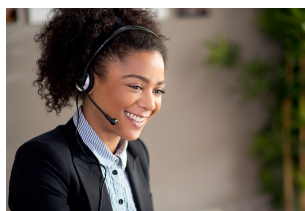
- Real time visualization
- Forecasts for the next 24 hours
- Steering instructions
- Pollution alerts
- Automatic reports



### Trichloramine badges:

Consumables allowing the initial calibration of the trichloramine sensor, then its quarterly recalibration.

Change of badge in less than a minute.



### Service:

Maintenance, sending of badges at regular intervals, implementation advice, telephone support; everything is included.

**All-inclusive contract**

# Pool monitoring

## TRICHLORAMINE

### PERIOD WITH NANOPOROUS SENSOR

Detection method	Optical reading with nanoporous material based consumable (patented technology)
Measuring range	15 ppb to 100 ppb (74 - 492 µg/m <sup>3</sup> )
Duration of the measurement	From 1 hour to 24 hours
Sampling method	Diffusive passive
Uncertainty	Range 0 - 40 ppb : ±10 ppb ±10% ; Range : 40 - 100 ppb : ±20 ppb ±10% (Daily average)
Accuracy	< 9 % on the whole range
Conservation of the consumable	Storage before use: 6 months from date of manufacture. Store at room temperature (between 15 and 25°C). Sensor to be used 10 minutes after opening the blister. Maximum duration of the measurement: 24 hours (according to trichloramine concentration)

### PERIOD WITHOUT NANOPOROUS SENSOR

Measuring range	15 ppb to 100 ppb (74 - 492 µg/m <sup>3</sup> )
Correlation with measurement by nanoporous sensors	> 90% (Correlation calculated on a study of more than 23,000 measurements taken between September 2021 and August 2022 in swimming pools throughout France)

## CO<sub>2</sub>/CONFINEMENT

Detection method	Non-dispersive infrared absorption spectrometry (NDIR)
Measuring range	0 to 5000 ppm
Resolution	1 ppm
Uncertainty	+/- 30 ppm +/- 3 % of the read value

## TEMPERATURE

Measuring range	-55°C à +125°C
Accuracy	+/- 2°C from -25°C to 100°C (+/- 0.5°C after offset)

## HUMIDITY

Measuring range	0 to 95 %
Accuracy	+/- 3% from 11% to 89% (+/- 7% on the rest of the range)

## GENERAL CHARACTERISTICS

Sampling frequency	10 minutes (CO <sub>2</sub> , T, P, RH, VOC); 30 minutes rolling average displayed every 10 minutes (Trichloramine)
Terms and conditions of use	Temperature between 22°C and +30°C. Humidity between 40 and 70% (RH)
Dimensions (L x W x H) approx / Weight	190 x 135 x 70 mm / 520 grams
Power supply/Autonomy	<ul style="list-style-type: none"> <li>• Mains connection</li> <li>• Battery back-up for short term power outages</li> </ul>
Display	LED operation indicators. Option : 3 colors flashing on configurable CO <sub>2</sub> thresholds
Communication	Wireless communication via LTE Cat-M1, NB-IoT or 2G network (optional)
Warranty	1 year parts and labor, excluding consumables

## SWIM'AIR VISION® SOFTWARE SOLUTION

Data access	<ul style="list-style-type: none"> <li>• Generation of reports over a customizable period of time</li> <li>• Unlimited data history</li> <li>• Data exportable to Excel file</li> </ul>
User account	Unlimited creation of user accounts with different rights. Setting of alert thresholds, e-mail sending, etc.
Ventilation control instructions	Possible intelligent control of ventilation according to indoor air quality predictions to avoid pollution peaks, over-ventilation and over-quality for energy savings

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