

Passive Sampler for O₃

Product Number SP20

updated: June 2025

Working Principle

The passive sampler enables the measurement of ozone concentration in air in two steps. First, the sampler independently collects the pollutant at the sampling site without an energy source. Then, the collected amount of pollutant is analysed in our Swiss laboratory accredited under ISO 17025.



The sampler operates based on the principle of passive diffusion: O₃ molecules enter the housing and are bound to an absorbent medium. Sampling occurs autonomously over 1 to 4 weeks. An integrated protective filter reduces environmental influences such as wind, allowing for precise measurements.

The method is validated according to EN 13528^[1], and analysis is performed using ion chromatography. The average ozone concentration is calculated from the amount of pollutant, exposure time, and sampling rate.

Only a protective shelter, which also functions as a holder, is required at the sampling site. Its simple installation allows for use even in remote locations. Each sampler is uniquely identifiable by serial number, ID, and expiration date.

Applications

Ground-level ozone is produced through chemical reactions between other pollutants, known as ozone precursors, in the presence of sunlight. The main sources are traffic-related or industrial emissions, primarily NO_x and VOCs. Thanks to its cost-effectiveness, ease of use, and high flexibility, passive samplers have numerous applications in air quality monitoring:

- **Air quality monitoring:** Series of measurements to assess ozone levels in urban, rural, or industrial areas
- **Environmental studies:** Analysis of ozone's impact on ecosystems, plant growth, or biodiversity ^[2,3]
- **Health research:** Investigation of the long-term effects of ozone exposure on human health, particularly regarding respiratory diseases
- **Other research projects:** Use in scientific studies examining chemical reactions in the atmosphere and analysing ozone formation
- **Indoor air quality assessment:** Monitoring in indoor environments such as laboratories, warehouses, or production facilities

Specifications

sampler type & dimensions	Badge-type (Ø 3 cm, height 2.5 cm)		
sampling time	1 – 4 weeks		
sampling rate at 20°C	11.2 ml/min		
upper working range	140 µg/m³		
detection limit	1 µg/m³ at 4 weeks or 2 µg/m³ at 2 weeks exposure		
expanded uncertainty	21.3 % at 60 µg/m³; indirect approach according to GUM		
analysis time	approximately 10 – 15 days		
shelf life and storage conditions	12 months 3 months	before exposure after exposure	in a sealed plastic bag at room temperature, protected from sunlight
transport conditions	in a sealed plastic bag		
environmental factors < 10%	wind: in the range of 0.5 – 2.2 m/s temperature: in the range of 5 – 35 °C relative humidity: 40 – 80%		
cross sensitivities	potentially oxidizing agents		
validation	within the accredited scope of ISO/IEC 17025 according to EN 13528 ^[1]		

References

- [1] EN 13528 1-3: Ambient air quality - Diffusive samplers for the determination of concentrations of gases and vapours; English Version; 2002
- [2] ICP Forest International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests, established 1985; <http://icp-forests.net/page/icp-forests-manual>
- [3] E. Gotthardt et. al, Chlorophyll-related indicators are linked to visible ozone symptoms: Evidence from a field study on native *Viburnum lantana* L. plants in northern Italy, Ecological Indicators, Volume 39, April 2014, 65-74, <http://dx.doi.org/10.1016/j.ecolind.2013.11.021>