

Passive Sampler for NO₂

Product Number SP01

updated: June 2025

Working Principle

The NO₂ passive sampler is designed to determine the average nitrogen dioxide concentration in the air over periods ranging from one to four weeks. The sampling process operates autonomously based on the principle of passive diffusion: NO₂ molecules diffuse into the sampler housing and are captured by an absorbent medium (TEA). A protective filter minimizes environmental influences such as wind, ensuring accurate and reliable measurements.



The device is simple to handle and only requires a protective shelter that also functions as a mounting device. This facilitates easy deployment even in hard-to-access or remote locations. Each sampler is clearly identifiable via batch number, individual ID, and expiration date.

Following the exposure period, the sampler is returned to our Swiss laboratory, which is accredited according to ISO/IEC 17025 standards. The analysis is conducted using photometric measurement in accordance with the EN 16339 standard [1]. The pollutant is extracted, and the mean NO₂ concentration is calculated based on the known exposure duration and sampling rate. Results are documented in a detailed report, providing a comprehensive assessment of the air quality at the sampling site.

Applications

Major NO₂ sources include industrial facilities, power plants, district heating systems, building heating, and motorized traffic. In contrast, natural emissions play a minor role. NO₂ irritates the respiratory system and serves as a chemical precursor for ground-level ozone and particulate matter. Additionally, NO₂ causes environmental damage, such as acidification and eutrophication of soils and water bodies. Due to its cost-effectiveness, ease of use, and proven equivalence [2] with the reference method according to EN 14211, the NO₂ diffusion tube can be employed across a wide range of air quality monitoring applications:

Regulatory air monitoring [3]: Use as fixed or indicative measurement in air quality monitoring networks to assess compliance with the EU annual limit value for NO₂ (currently 40 µg/m³, reduced to 20 µg/m³ from 2030).

Spatial exposure analyses: To assess local NO₂ concentrations, e.g., in urban development projects, source and cause investigations, or to evaluate mitigation measures.

Epidemiological studies: For use in health and environmental research to quantify pollutant exposure.

Indoor air quality monitoring: To assess air quality in enclosed spaces such as laboratories and production halls

Industrial and safety monitoring: For overseeing industrial processes and perimeter security.

Specifications

sampler type & dimensions	Palmes tube type (Ø 1 cm, length 7.3 cm)		
sampling time	1 – 4 weeks		
sampling rate at 20°C	0.734 ml/min (with protective filters)		
upper working range	350 µg/m ³		
detection limit	0.25 µg/m ³ at 4 weeks or 0.5 µg/m ³ at 2 weeks exposure		
expanded uncertainty	21% at 40 µg/m ³ ; indirect approach according to GUM <15% at 40 µg/m ³ : based on direct comparison with reference method		
analysis time	approximately 10 days		
shelf life and storage conditions	24 months before exposure	6 months after exposure	sealed plastic bag at room temperature, protected from sunlight
transport conditions	in a sealed plastic bag		
environmental factors < 10%	wind: < 6 m/s temperature: in the range of 8 – 25 °C relative humidity: 20 – 90%		
cross sensitivities	The presence of NO in the presence of O ₃ and PAN can result in multiple detections		
validation	within the accredited scope of ISO/IEC 17025 according to EN 13528/16339 ^[1]		

References

- [1] EN 16339:2025; Ambient air - Method for the determination of the concentration of nitrogen dioxide by diffusive sampling.
- [2] Zang, Thorsten (2021) Messen von Stickstoffdioxid in der Außenluft: Nachweis der Gleichwertigkeit von Passivsammlern. Landesamt für Natur, Umwelt und Verbraucherschutz NRW. Recklinghausen (LANUV-Fachbericht, 108)
- [3] Directive (EU) of the European Parliament and of the council on ambient air quality and cleaner air for Europe, 2024/2881, <https://eur-lex.europa.eu/eli/dir/2024/2881/oj>