

Passive Sampler for NO_x

Product Number SP12 and SP12-S (combined with NO₂)

Working Principle

This passive sampler measures the nitrogen oxide (NO_x) concentration in two steps: it independently collects the pollutant at the measurement site without an energy source, and afterward, the accumulated amount is analysed in our Swiss laboratory accredited under ISO 17025. The procedure is validated according to EN 13528. The average NO_x concentration is determined based on the pollutant amount, exposure time, and sampling rate [1].



The sampler operates using passive diffusion: NO and NO₂ molecules diffuse in and are bound by the absorbing medium TEA. NO is converted into NO₂ by an oxidant during the process. The single NO_x sampler does not differentiate between NO and NO₂ but reports the total amount as NO₂ equivalent (assuming NO_x = NO + NO₂). When used in combination with a NO₂ sampler (NO_x-Set; SP12-S), the individual fractions can be determined separately.

Sampling is autonomous and lasts from 1 to 4 weeks. A protective filter minimizes environmental influences such as wind and ensures accurate results. A protective housing, which also functions as a mounting bracket, is all that's required on site, making installation straightforward even in remote areas. Each sampler can be uniquely identified by its batch number, ID, and expiration date.

Applications

Due to its cost-effectiveness, ease of handling, and high flexibility, the passive sampler is used in numerous applications for measuring NO_x in the air. Main sources of NO_x include the combustion of fossil fuels, metal processing, cement production, nitric acid manufacturing, and waste incineration. Natural sources like lightning or wildfires contribute only minimally to NO_x concentrations. The following areas of application arise from this:

- **Regulatory air quality monitoring** through indicative NO_x measurements or as a complement to NO₂ measurements, especially to ensure compliance with the EU directive's critical value of 30 µg/m³ for the protection of vegetation and ecosystems [2].
- **Determination of the spatial distribution** of NO_x, e.g., in emission measurement networks, to support urban development projects, traffic control measures, or to verify implemented reduction strategies.
- Studies on the **impacts** of pollutants **on humans** and the environment.
- Monitoring **indoor air quality** in laboratories, warehouses, or manufacturing facilities.
- Oversight of **industrial processes** or the perimeter of a site where the NO/NO₂ ratio is significant.

Specifications

sampler type & dimensions	Tube type (Ø 1 cm, length 7.3 cm)		
sampling time	1 – 4 weeks		
sampling rate at 20°C	0.734 ml/min (NO ₂ equivalents); 0.956 ml/min for NO (both with protective filters)		
upper working range	200 µg/m ³		
detection limit	1.25 µg/m ³ at 4 weeks or 2.5 µg/m ³ at 2 weeks exposure		
expanded uncertainty	19 % at 30 µg/m ³ ; indirect approach according to GUM		
analysis time	approximately 10 – 15 days		
shelf life and storage conditions	6 months 3 months	before exposure after exposure	Fridge, store in a sealed plastic bag
transport conditions	in a sealed plastic bag		
environmental factors < 10%	wind: < 6 m/s		
	temperature: in the range of 10 – 25 °C		
	relative humidity: 20 – 90%		
cross sensitivities	none known		
validation	within the accredited scope of ISO/IEC 17025 according to EN 13528		

References

- [1] EN 13528 1-3: Ambient air quality - Diffusive samplers for the determination of concentrations of gases and vapours; Requirements and test methods.
- [2] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, <https://eur-lex.europa.eu/eli/dir/2008/50/oj>