

Nitric Oxide Analyzer (NOA 280i)

Overview

The Sievers Nitric Oxide Analyzer (NOA* 280i) offers the most versatile detection system for Nitric Oxide (NO) analysis. Employing GE Analytical Instruments' highly sensitive, ozone-chemiluminescence technology, the NOA 280i has unsurpassed versatility for liquid and exhaled breath NO measurement. With over 1,000 publications using the Sievers Nitric Oxide Analyzer, the NOA has proven to be the instrumentation of choice by researchers worldwide.



Applications

Liquid Samples

The NOA 280i measures nitric oxide, nitrite, nitrate or nitrosothiols in most biological samples. Concentrations, ranging from low nanomolar to millimolar levels, can be measured in sample volumes ranging from a few microliters to several milliliters.

Exhaled Breath Samples

Exhaled nitric oxide may be a useful marker of airway inflammation and can easily be measured with the NOA 280i. Fast response time and low sample flow rates allow for measurement of exhaled NO in humans and animals.

Features

User-Friendly Operation

Easy-to-use, menu-based firmware provides complete analyzer control. Create, store and easily upload methods for quick retrieval of multiple application parameters.

Low-Cost Maintenance

Requires minimal maintenance—consumables are inexpensive and require replacement approximately every six months (900 hours of operation). The firmware tracks operating time and alerts the user when to replace consumables or perform routine maintenance.

Compact Size

Compact footprint conserves valuable bench space. The vacuum pump can be conveniently located either under the bench or on a cart with the analyzer.

Powerful Data Collection and Analysis

NOAnalysis,* custom-designed software for data collection and analysis, includes: Liquid, Restricted Exhaled Breath, Breath-by-Breath and Bag Sampling Programs. With four different programs for liquid and gas-phase measurements, the user can process data over the wide range of sampling techniques.

Full-Range Service Support

GE Analytical Instruments offers a full range of factory and on-site services.

Easy-to-Perform Calibration

Calibration is easy-to-perform with the GE Analytical Instruments Calibration Kit.

Liquid Applications

Measure nitric oxide and its reaction products, nitrate, nitrite and nitrosothiols, in virtually any biological fluid including: plasma, sera, urine, cerebral-spinal fluid, cell culture media, tissue homogenates and perfusates.

Nitrate

Nitrate (NO_3^-), the major oxidation product of NO in some cell culture systems and most physiological fluids, is formed when nitric oxide reacts with oxyhemoglobin or superoxide anion. Use the NOA 280i to measure total nitric oxide by converting the nitrate and nitrite to nitric oxide using vanadium (III) chloride in hydrochloric acid at 90° C.

Nitrite

Nitrite (NO_2^-), the major oxidation product of NO in the absence of oxyhemoglobin or superoxide anion, is formed when nitric oxide reacts with dissolved oxygen. Use the NOA 280i to measure nitrite by converting the nitrite to nitric oxide using room temperature iodide and acetic acid.

Nitrosothiols

Nitrosothiols can be measured directly using the NOA 280i. Measure low molecular weight compounds such as S-nitrosoglutathione using a Cu(I)/Cysteine reagent. Measure higher molecular weight species (S-nitroso-albumin or hemoglobin) using iodine, iodide and acetic acid after chemical or chromatographic removal of nitrite.

Liquid Accessories

Purge Vessel

Use the NOA 280i, in conjunction with the Purge Vessel, to measure most reaction products of nitric oxide. The Purge Vessel's design ensures quantitative conversion of nitrate, nitrite, and nitrosothiols to nitric oxide, resulting in sharp, well-defined data peaks. Clean-up is quick and simple with the built-in drain port.

Exhaled Breath Applications

Perform all current exhaled NO techniques including: On-line, Off-line, Nasal, Breath-by-Breath and Chamber Sampling.

On-Line Sampling

Use our patented technique¹ and the On-Line NO Breath Kit* to measure on-line concentrations of NO in exhaled breath. The NOA 280i's built-in exhaled pressure biofeedback system and the optional Thermal Mass Flowmeter facilitate exhalation at constant flow rates.

Off-Line Sampling

Use GE Analytical Instruments patented technique¹ and the Bag Collection and Sampling Kit to collect subjects' exhaled breath for later analysis. The concentration of NO in the Mylar® collection bags is stable for 8 to 12 hours. Reuse the bags after a simple cleaning procedure.

Nasal Sampling

Increased levels of nasal nitric oxide have been identified in subjects with sinusitis, rhinitis and asthma. On-line measurement of nasal nitric oxide may be a useful marker of inflammation in the nasal passages and paranasal sinuses. Use a constant transnasal flow with slow oral exhalation against a resistance to provide a fast and repeatable measure of nasal NO.

Breath-by-Breath Analysis

Use the Breath-by-Breath technique to measure exhaled NO in subjects who cannot perform on-line or off-line exhaled breath maneuvers, i.e., ventilated subjects, small children and animals. The NOA 280i's auxiliary pressure transducer, and the NOAnalysis software, determine the beginning and end of each exhalation and the concentration of NO for each exhalation.

Chamber Sampling

Use the Chamber Sampling method to measure exhaled NO from spontaneously breathing small animals, such as mice and rats.

Other Gas Applications

Use the NOA 280i to measure gas-phase NO in the GI tract during endoscopy. The NOA 280i can also be used to measure NO directly in the airways during bronchoscopy.

Exhaled Breath Accessories

On-Line NO Breath Kit

Use the On-Line NO Breath Kit to accommodate flow rates from 30 to 250 mL/sec, to meet the American Thoracic Society's (ATS) and the European Respiratory Society's (ERS) recommendations for on-line exhaled NO measurement.

Thermal Mass Flowmeter

Use the Thermal Mass Flowmeter with the On-Line NO Breath Kit for direct measurement of exhalation flow rate.

Off-Line Sampling Kits

The Off-Line Sampling Kits include an inspiratory gas filter to reduce the concentration of NO in inspired air to <5 ppb. Two different bag collection kits are available.

Following ATS recommendations for off-line exhaled NO, use the ATS Compliant Bag Collection and Sampling Kit to collect the entire vital capacity at a flow rate of 350 mL/sec. The ATS Kit uses 12 L Mylar bags.

Use the Bag Collection and Sampling Kit to collect off-line exhaled NO at 50 mL/sec, the same conditions the ATS recommends for on-line sampling. This kit employs the dead space volume discard technique with subsequent collection of exhaled breath in 1.5 L Mylar bags.

Calibration Kit

The Calibration Kit includes a Zero Air Filter, to generate air containing <1 ppb NO from room air, the calibration gas, and a low flow regulator.

Calibration Gas

A small, lightweight, disposable cylinder of 45 ppm NO in N₂, which provides sufficient NO calibration gas for three to four months of operation.

Zero Air Filter

The Zero Air Filter removes NO from ambient air providing a clean (<1 ppb nitric oxide) air source for calibration.

Bacterial/Viral Filters

The single-subject, disposable Bacterial/Viral Filters, with >99.9% bacterial and viral filtration efficiency, are used with the On-Line NO Breath and the Bag Collection and Sampling Kits



Purge Vessel



On-Line NO Breath Kit



Bag Collection and Sampling Kits

Specifications	Liquid Samples	Gas Samples
Sensitivity	1 picomole (1 nM for a 1 mL injection)	0.5 ppb
Range	Nanomolar to millimolar	0.5 ppb-500 ppm
Repeatability	+/- 5%	+/- 5%
Sample	Volume: 0.001-1 mL	Flow rates: 10-200 mL/min

General	
Response Time	Electronics: 67 milliseconds to 90% full scale. Lagtime: 1 second
Outputs	(1) analog 0-1V, 0-10V
	(1) digital RS-232 (9600-38400 Baud)
	(1) printer parallel port
Operator selectable Data Sampling Rate	32, 16, 8, 4, 2, or 1 samples per second
	12, 4, 2, 1, 0.2, or 0.1 samples per minute
Power Requirements	U.S. — 110/115V, 60 Hz (6A)
	Japan — 90/100V, 50/60 Hz (7A)
	Europe, Asia and South America — 220/240V 50 Hz (3A)

Dimensions	
NOA 280i	41 H x 16 W x 51 L cm
	16 H x 6.2 W x 20 L in
	Weight: 16 kg
	Weight: 35 lb
Vacuum Pump	37 H x 19 W x 48 L cm
	14.5 H x 7.5 W x 19 L in
	Weight: 21.5 kg
	Weight: 47 lb

