



Sievers InnovOx Laboratory TOC Analyzers

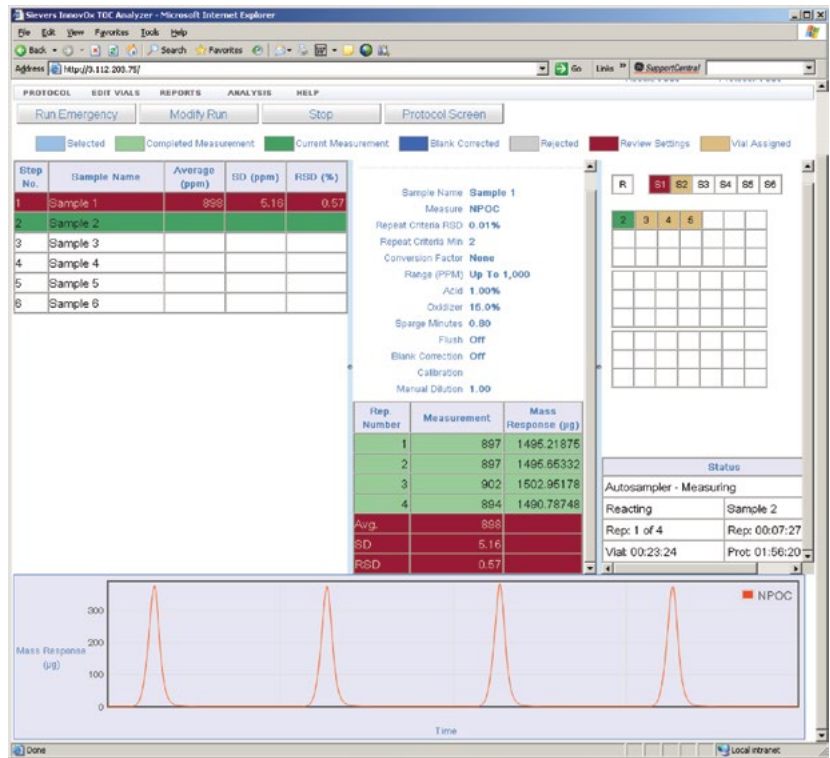
for organics monitoring



GE Power
Water & Process Technologies
Analytical Instruments

Overview

GE Analytical Instruments' Sievers* InnovOx Total Organic Carbon (TOC) Analyzers are designed to measure organic carbon in a broad range of water samples from industrial process water to wastewater influent and effluent. All InnovOx Analyzers include robust sample handling capability, industry-leading supercritical water oxidation (SCWO) technology, and simple maintenance and operation, all designed to enhance performance and reliability in challenging applications. For well over 20 years, customers around the globe have trusted the Sievers name for industrial water organic monitoring.

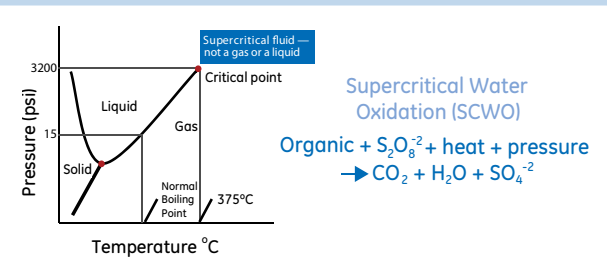


InnovOx Laboratory TOC Analyzer Autosampler Protocol PC Interface

Supercritical Water Oxidation (SCWO)

Supercritical water oxidation (SCWO) was originally developed to treat large volumes of aqueous waste streams, sludges, and contaminated soils. SCWO destroys organic wastes using an oxidant in water and temperatures and pressures above the critical point of water: 375°C (770°F) and 22.1 mPa (3,200 psi). These conditions enable rapid and complete oxidation of organic carbon to CO₂.

Today, SCWO research and development is focused on treating a variety of toxic and hazardous organic wastes. GE Analytical Instruments is the first company to use this technique in a commercial laboratory TOC instrument.



Organics Monitoring Applications

Biological wastewater plant optimization. Monitoring organics before and after treatment allows operators to optimize the F/M (food to microorganism) ratio, thereby enhancing organic removal, reducing sludge and chemical usage, and avoiding system upsets.

Wastewater effluent monitoring and COD/BOD correlation.† As an automated laboratory surrogate for time consuming and manual COD and BOD tests, the InnovOx TOC instrument help monitor the performance of a wastewater system. Optimizing the process provides confidence that regulatory testing results will be below permit limits.

High-salt seawater and brine monitoring. GE's patented SCWO oxidation technology was designed to measure organics reliably in high-salt or brine samples commonly found in the refining industry. Unlike combustion technologies that can easily be plugged or damaged by salt, the InnovOx oxidation reactor is self-cleaning and is not affected by salts coming out of solution.

Industrial/commercial laboratory sampling. The InnovOx instrument with optional high-capacity Autosampler is ideal for reliably analyzing water samples from a broad range of sources including water reuse, cooling towers, boilers, research applications, or environmental testing.

† BOD or COD values are calculated based on the TOC measurement.

Product Capabilities

- Wide dynamic range up to 50,000 ppm TOC
- Autosampler with stirring and rinse station options for high volume laboratory applications
- Patented supercritical water oxidation (SCWO) for superior TOC recovery and high reliability
- Reliable NDIR detection technology with no moving parts
- Straightforward operation and maintenance
- Versatile measurement modes include TOC (TC-IC) or NPOC
- Handles tough TOC samples, like cellulose and brine, without increased maintenance or downtime

Compliance

US EPA Method 415.1 – Organic carbon in drinking, surface, seawater, and waste water

US EPA Method 415.3 – Organic carbon in surface and drinking water

US EPA Method 9060A – Organic carbon in ground, surface, saline, and waste water

CEN Method DIN EN 1484 – Organic carbon in drinking, ground, surface, sea, and waste water

ISO 8245 – Organic carbon in drinking, ground, surface, sea, and waste water

Pattern Approval Certificate for Measuring Instruments of the People's Republic of China, issued by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China

Options

GE Autosampler

For high-volume laboratory applications, the InnovOx Analyzer can be used with the GE Autosampler. It handles up to 120 35-mL sample tubes or up to 63 40-mL or 60-mL vials in one protocol. An optional stirring station creates a homogeneous mixture for analysis during the sampling process and an optional wash station reduces sample-to-sample carryover.



Air Filter

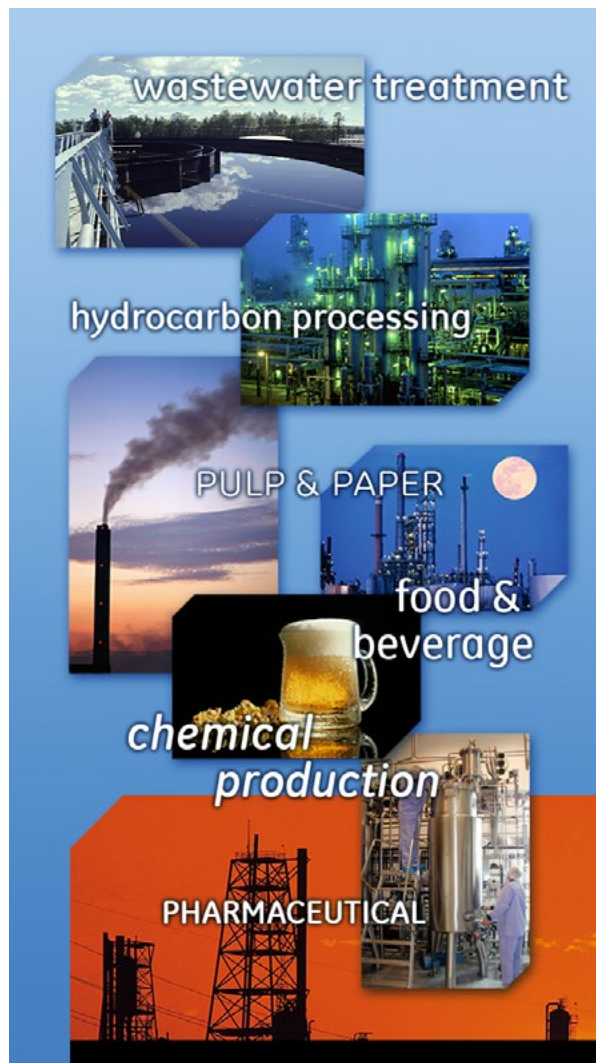
The Air Filter is used to purify ambient air and pressurize it sufficiently for use as a sparge and carrier gas. It easily attaches to the back of the analyzer to avoid the use of external carrier gas cylinders.



InnovOx Measurements for Brine, Cellulose, and Humic Acid Samples			
Replicate	28% Brine Solution (Process Sample)	90 m Cellulose Solution (100 ppm C)	Humic Acid Solution (10 ppm C)
1	5.80	95.1	10.2
2	5.69	98.0	10.1
3	5.59	90.9	10.4
4	5.68	104	10.4
5	5.69	93.2	10.2
6	5.53	98.0	10.2
7	5.49	93.3	10.4
8	5.70	101	9.91
9	5.57	103	9.86
Mean	5.66	97.3	10.19
Stand. Dev.	0.12	4.50	0.20
RSD	2.13%	4.63%	2.0%

InnovOx robust SCWO oxidation

Industries Served



System Specifications

InnovOx Lab TOC Analyzer	
Operating Specifications¹	
Analysis Modes	NPOC, TOC (TC-IC), TC, IC
Range	0.250 to 50,000 ppm TOC
Precision	RSD ≤3% of reading at >5 ppm NPOC or TOC
Accuracy	Greater of ± 3% or ± 0.25 ppm, 1 to 100 ppm, NPOC or TOC
Linearity	R ² ≥ 0.995, measured as NPOC
LOD	≤0.10 ppm NPOC mode ²
TOC Calibration Stability	Up to 6 months
Analysis Time	2.6 to 8.3 minutes
Particle Diameters in Sample	≤800 µm diameter
Sample Temperature	10-60 °C (41-140 °F)
Ambient Temperature Range	10 to 40 °C (50-104 °F)
Sampling	Ambient pressure, 0.08 to 2.82 mL sample volume per analysis
Analyzer Specifications	
Sample Capacity	Up to 120 with optional Autosampler ³ (or single standard vial port)
Outputs	Ethernet Port (1); USB Ports (3)
Display	Color LCD w/touch-screen
Power	100 – 240 ± 10% VAC, 50 – 60 Hz, 400 VA
Installation/Overtoltage Category	II
Dimensions	H: 52.05 cm (20.5 in.); W: 32.26 cm (12.7 in.); D: 58.42 cm (23.0 in)
Dimensions (Autosampler)	H: 52.2 cm (20.5 in.); W: 31.1 cm (12.25 in.); D: 53.3 cm (21.0 in.)
Weight	22.41 kg (49.4 lb); 14.1 kg (31.1 lb) for optional Autosampler
Safety Certifications	CE, ETL listed. Conforms to UL Std. 61010-1. Certified to CSA C22.2 NO. 61010-1
Environment	
Maximum Relative Humidity	Up to 95%, non-condensing
Normal Operating	Indoor use only. Keep instrument and reagents out of direct sunlight.
Maximum Altitude	3,000 m (9,800 ft)
Pollution Degree	2

¹ Stated analytical performance is achievable under controlled laboratory conditions that minimize operator and standards errors.

² NPOC mode, bottled N₂ as carrier gas. This performance is achieved under controlled conditions where variables that influence low-level performance have been minimized or eliminated. This performance may not be achievable on instruments delivered before August 2016.

³ Up to 63 sample tubes for 40mL and 60mL vials. Up to 120 sample tubes for 35mL vials.

www.geinstruments.com/innovox

* Trademark of General Electric Company; may be registered in one or more countries.

GE Power
Water & Process Technologies
Analytical Instruments

