Altium

VEOLIA

Sievers* InnovOx ES Laboratory TOC Analyzers

for Organics Monitoring

WATER TECHNOLOGIES

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Overview

Sievers InnovOx ES 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 to concentrated brine in chemical applications. All InnovOx ES Analyzers include robust sample handling capability and industry-leading supercritical water oxidation (SCWO) technology, designed to enhance performance and reliability in challenging applications.

Organics Monitoring Applications

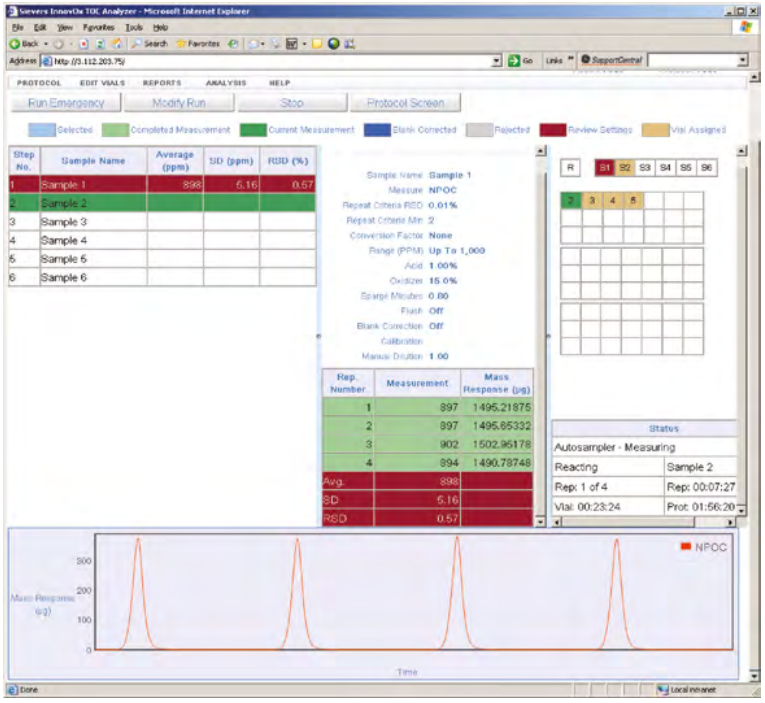
Biological wastewater plant optimization. Monitoring organics before and after treatment allows operators to optimize the F/M (food to microorganism) ratio, thereby enhancing organic removal, reducing sludge and chemical usage, and avoiding system upsets.

Wastewater effluent monitoring and COD/BOD correlation.† As an automated laboratory surrogate for time consuming and manual COD and BOD tests, the InnovOx ES 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. Our 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.

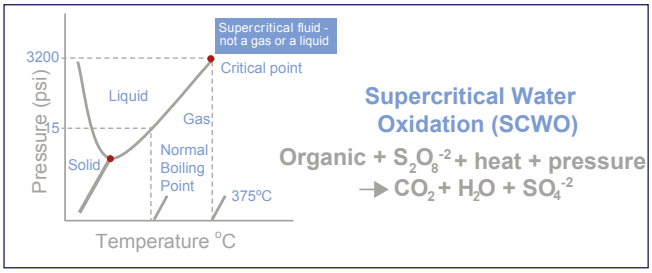
Industrial/commercial laboratory sampling. The InnovOx ES instrument with optional high-capacity Autosampler is ideal for reliably analyzing water samples from a broad range of sources including water reuse, cooling towers, boilers, research applications, or environmental testing.

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



Supercritical Water Oxidation (SCWO)

Sievers InnovOx TOC Analyzers employ a unique supercritical water oxidation approach to oxidation that uses both heat and pressure. In a sealed reactor, the sample and persulfate are heated to 375 °C (770 °F). This high temperature and corresponding increased pressure of 22.1 MPa (3,200 psi), allows for the supercritical state to be achieved, and dramatically improves the efficiency of the oxidation process, thereby offering better recovery for difficult matrices. As an added benefit, inorganic salts are no longer soluble at these conditions, and therefore do not interfere with the oxidation reaction.



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
- Versatile measurement modes include TOC (TC-IC) or NPOC
- Handles tough TOC samples, like cellulose and brine

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

SW-846 Test 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

ASTM D5173 - Standard Guide for On-Line Monitoring of Total Organic Carbon in Water by Oxidation and Detection of Resulting Carbon Dioxide

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

Autosampler

For high-volume laboratory applications, the InnovOx ES Analyzer can be used with the Sievers 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 ES Robust SCWO Oxidation

Industries Served

- Pharmaceutical
- Hydrocarbon Processing
- Pulp and Paper
- Food and Beverage
- Chemical Production
- Wastewater Treatment

System Specifications

Operating Specifications[1]

Analysis Modes	NPOC, TOC (TC-IC), TC, IC
Range	50 ppb 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	$R^2 \geq 0.995$, measured as NPOC
LOD	≤50 ppb
TOC Calibration Stability	Up to 6 months
Analysis Time	2.6 to 8.3 minutes
Smallest Inner Diameter (ID)	1.42 mm or 1420 µm
Sample Temperature	5-60 °C (41-140 °F)
Ambient Temperature Range	10-40 °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[2] (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/Overvoltage 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. Up to 63 sample tubes for 40 mL and 60 mL vials. Up to 120 sample tubes for 35 mL vials.

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