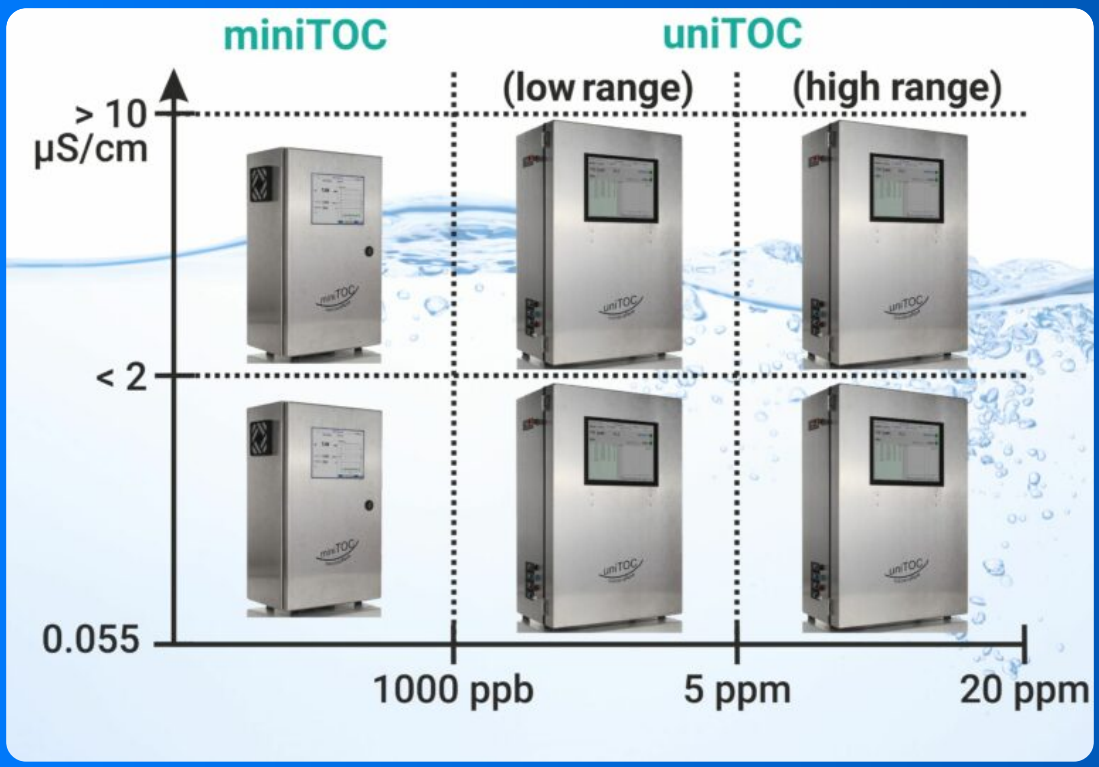
membraPure TOC Analyzers

Precision for Every Water Quality

membraPure



Overview: Tailored TOC Solutions for Diverse Applications

membraPure offers a comprehensive range of Total Organic Carbon (TOC) analyzers designed to meet the stringent demands of various industries, from ultra-pure water applications in pharmaceuticals and power plants to wastewater analysis from production sites (up to 20 ppm). Our systems are engineered for outstanding analysis results across different water qualities, providing customized solutions to fit your specific requirements. The core of our technology relies on advanced UV radiation for efficient oxidation, with the uniTOC system offering an enhanced oxidation process through additional reagent dosage for broader application spectrum. The miniTOC utilizes conductivity measurement, while the uniTOC employs highly sensitive NDIR (Non-Dispersive Infrared) detection for precise TOC determination.

Understanding TOC Analysis: Methods and Principles

Total Organic Carbon (TOC) is a critical parameter for assessing water quality, indicating the amount of carbon bound in organic compounds. Its measurement is essential in industries where water purity directly impacts product quality, process efficiency, or

environmental compliance. membraPure TOC analyzers employ robust and reliable methods for accurate TOC quantification:

UV Oxidation

Both miniTOC and uniTOC systems utilize UV radiation as the primary oxidation method. UV oxidation is a highly effective technique for breaking down organic compounds into carbon dioxide (CO_2) and water. This method is particularly advantageous for its simplicity, efficiency, and the absence of hazardous reagents, making it suitable for a wide range of water matrices, especially pure and ultra-pure water. The UV light directly oxidizes organic molecules, converting them into CO_2, which is then measured.

Detection Methods: Conductivity vs. NDIR

Conductivity Measurement (miniTOC)

The miniTOC system employs conductivity measurement for TOC determination. In this method, the CO_2 produced from UV oxidation dissolves in a stream of pure water, forming carbonic acid. This acid increases the electrical conductivity of the water, which is directly proportional to the CO_2 concentration and, consequently, the original TOC level. This method is highly sensitive and ideal for pure and ultra-pure water applications where background conductivity is low (typically < 2 µS/cm, with optional extended range up to 30 µS/cm). [1]

NDIR Detection (uniTOC)

The uniTOC system utilizes Non-Dispersive Infrared (NDIR) detection. NDIR is a highly precise and widely recognized method for measuring CO_2 gas. After UV oxidation, the generated CO_2 is stripped from the sample and passed through an NDIR detector. The NDIR sensor measures the absorption of infrared light by CO_2 molecules, providing a direct and accurate quantification of the carbon content. This method is particularly robust and offers a wider application spectrum, making it suitable for samples with

varying conductivity and higher TOC concentrations, as it directly measures CO2 and is not limited by the sample's conductivity. [2]

Customizable Systems for Optimal Performance

membraPure TOC Analyzers are designed with flexibility in mind, allowing for customization to perfectly match your application's needs. The choice between miniTOC and uniTOC depends on the specific water quality and required detection range:

SYSTEM	OXIDATION METHOD	DETECTION METHOD	CONDUCTIVITY RANGE (MS/CM)	TOC RANGE (APPRO
miniTOC	UV	Conductivity	< 2 (optional up to 30)	0.055 ppb - 1000 p
uniTOC	UV (with optional reagent)	NDIR	No limit	5 ppb - ppm

Key Features Across Our TOC Analyzer Range

membraPure TOC Analyzers are equipped with features that ensure ease of use, reliability, and compliance:

- **Analyze pure and ultrapure water:** Specifically designed for high-purity water analysis, crucial for pharmaceutical, semiconductor, and power industries.
- **Offline Mode:** Both systems offer an offline mode to measure grab samples, providing flexibility for laboratory analysis.
- **IQ/OQ Documents:** All systems can be qualified with Installation Qualification (IQ) and Operational Qualification (OQ) documents, ensuring compliance with regulatory standards.
- **Flexible Configurations:** Available in benchtop, wall-mounted (with inclined display), and bench-integrated configurations to suit various lab environments.
- **Compact Housing:** Small footprint design for efficient use of laboratory space.
- **Fast & Easy Cartridge Replacement:** Minimizes downtime and simplifies maintenance.
- **Easy-to-use Software Interface:** Intuitive software for straightforward operation and data management.
- **Integrated TOC Monitoring:** Continuous monitoring capabilities for real-time data.
- **Large Touchscreen:** For easy navigation and data visualization.
- **Flexible and Lockable Dispenser:** Ensures precise sample handling and security.
- **Up to 12 months trackable water quality values:** Comprehensive data logging for long-term trend analysis and compliance.

Applications

membraPure TOC Analyzers are indispensable in a variety of applications where accurate TOC measurement is critical:

Pharmaceutical Industry

Monitoring ultra-pure water for drug manufacturing, ensuring compliance with pharmacopoeia standards (e.g., USP, EP, JP).

Power Plants

Assessing water quality in boiler feed water and condensate to prevent corrosion and scaling.

Semiconductor Manufacturing

Ensuring the purity of water used in sensitive processes to prevent contamination.

Environmental Monitoring

Analyzing wastewater from production sites to ensure compliance with discharge regulations.

Research & Development

Supporting various scientific studies requiring precise organic carbon quantification.

Laboratory Applications

General lab use for quality control and process monitoring of water.

membraPure: Your Partner in Water Analysis

With membraPure, you gain a partner committed to delivering high-quality, reliable, and customizable TOC analysis solutions. Our systems are built to provide accurate and consistent results, supporting your critical processes and regulatory compliance needs.

Contact Us

For detailed specifications, customization options, or to discuss your specific application needs, please contact membraPure:

- **Website:** membrapure.de/toc-analyzers/

References

- [1] ELGA LabWater. (2021, April 15). Total Organic Carbon (TOC) and its Measurement. Retrieved from https://www.elgalabwater.com/blog/total-organic-carbon-toc
- [2] Perma Pure. (2021, April 12). Solving Water Vapor Challenges in Total Organic Carbon Analysis with NDIR. Retrieved from

https://www.permapure.com/2021/04/12/solving-water-vapor-challenges-in-total-organic-carbon-analysis-with-ndir/

Manufacturer: membraPure
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