

Aurora 1030W TOC Analyzer

Wet Oxidation Total Organic Carbon Analyzer



- Wide operational range (2 ppb–30,000 ppm)
- Supports TC/TIC/TOC/NPOC analysis techniques and standard measurements
- Parallel reaction chamber option available for high-throughput concurrent sample processing
- Upgradable allowing performance of combustion and wet heated persulfate TOC analysis techniques on a single instrument
- Laboratory and at-line configurations available for process monitoring

Description and Function

The Aurora 1030W TOC Analyzer processes aqueous samples for analysis of the total organic carbon (TOC), total inorganic carbon (TIC), and non-purgeable organic carbon (NPOC) content of the samples. Using heated persulfate oxidation technology, samples containing 2 ppb to 30,000 ppm of organic carbon can be analyzed. The Aurora 1030W supports USEPA-approved methods, Standard Methods, ASTM, DIN/ISO/CEN, USP, and EU Methods. Depending upon the protocol employed, up to 300 samples per 24-hour period can be analyzed, and in excess of 100,000 samples per year.

Operating Principle

The Aurora 1030W employs a multi-step analysis technique to distinguish and quantify different forms of carbon present in sample matrices and to determine TOC content. The value reported as TOC is the non-purgeable organic carbon (NPOC) content. NPOC is derived by first determining, or sparging, the TIC content of a sample and then oxidizing the TIC-free sample using heated sodium persulfate.

TIC concentration is determined by acidifying a sample with phosphoric acid to a pH less than 2. Carbonates and bicarbonates in the sample dissociate to form CO_2 , which is measured by a solid state non-dispersive infrared (SSNDIR) detector and reported in mass and concentration values.

The TIC-free sample is then oxidized using 100 °C sodium persulfate. Organic compounds are oxidized and converted into carbon to CO_2 , which is then quantified by the NDIR detector. The result is reported as the TOC content in both mass and concentration of carbon.

The Aurora 1030W also supports other analytical approaches, including TC and TOC by subtraction (TC–TIC). TC is determined by introducing unsparged sample into the reaction chamber with acid and sodium persulfate and then heating to 100 °C.

The CO_2 released from the simultaneous dissociation and oxidation of carbon compounds present in the sample is measured by the SSNDIR detector.

Principal Applications

- Wastewater
- Seawater
- Industrial process water
- Drinking water
- Groundwater
- Cooling water
- Ultrapure water
- Water for injection
- Semiconductor
- Pharmaceutical
- Boiler feedwater
- Cleaning validation

Methods

- ASTM D4839, D4779
- Standard Method 5310C
- ISO 8245
- USEPA 415.1, 415.3, 9060
- DIN/ISO/CEN EN 1484
- EU 22.44, 23
- USP 23 <643>



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Specifications

Method compliance	USEPA, CEN, USP, EUP, ASTM, ISO, STD methods
Measurement range (ppm)	2 ppb C–30,000 ppm C
Method TC	Acid and persulfate reaction
Method TIC	Acidification with phosphoric acid and sparging
Method TOC	NPOC by heated persulfate oxidation or TC–TIC
Heating	Adjustable to 100 °C in 1 °C increments
Analysis time	From three minutes
Oxidation technique	Wet chemistry heated persulfate, liquid samples
Options available	EFC, A _{TOC} data management graphic software, Windows® brand PC software
Particulate handling	Up to 500 µm
High salt tolerance	Up to 26%
Reproducibility	1.5% or 2 ppb, whichever is greater
Linearity	±1% FS or 2% relative, whichever is greater
Calibration stability	30+ days verifiable with programmable auto-validation (application dependent)
Sample pathway	Color coded Teflon® with automatic cleaning in all injection modes
Sample injection	Manual syringe, sipper, autosampler, or on-line.
Sample handling	Automatic syringe with an isolation loop to prevent contamination
Sample injection volume	10 µL–10 mL
IC pretreatment	Available with autosampler
Certifications	CE, EMC, EN50082-1, and EN 55011 Group 1 Class A
Operation mode	Standalone (Windows CE) or networked via PC software (Windows 2000 Pro or XP Pro)
Operating interface	Touchscreen LCD or Windows PC (optional)
Basic software	Single instrument operation and simple data transfer to PC (included)
Optional A _{TOC} Software	Network LAN/LIMS operation, data management, custom reports, 21 CFR 11 compliance
PC specifications (optional)	Pentium® 4, 512 MB RAM, 40GB (1 GB HD for TOC), 1024 x 768, CD-ROM
Reagent purge	Yes
Reagents required	Sodium persulfate, 5% phosphoric acid, rinse water
Automatic dilution and beginning point	Serial/autodilution 1:1,000, over calibration curve range
Communications	Parallel and serial communications (RS-232-C), Ethernet
Analog outputs (optional)	Four, 4–20 mA/0–10 V user programmable
Input and output relays	Two user-programmable inputs, two user-programmable outputs
Relay output (optional)	Four user-programmable outputs
Ambient temperature range, humidity	10–45 °C, <90% non condensing
Printer (optional)	Serial from analyzer and/or PC from A _{TOC} Software
Power supply	Variable voltage input, 100–240 V _{AC} , 50/60 Hz; 950 W
Benchspace with autosampler, PC	Rotary <46 cm (18"); XYZ <95 cm (38")
Gas type, grade, and consumption	N ₂ (99.998% purity or better) and zero-grade air, O ₂ (99.998%); 345–415 kPa; <700 mL/min
Dimensions	42.5 cm H x 49.5 cm W x 41.9 cm D (16.75" H x 19.5" W x 16.5" D)
Weight	15.4 kg (34 lbs), 34.5 kg (76 lbs) with rotary autosampler option
Warranty	12 months labor and parts



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Validation Package for GLP/GMP Applications

A complete IQ, OQ, PQ documentation package with on-site support.

A 21 CFR Part 11 compliant software and comprehensive IQ/OQ/PQ instrument validation package ensures the Aurora 1030W meets all requirements for operation in GLP and GMP environments.

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