

	<i>Process analysis</i> uniTOC-online uniTOC-process	<i>Laboratory analysis</i> uniTOC -lab
Model		
analysis mode	UV oxidation/ NDIR	UV oxidation/ NDIR
analysis parameters	TC, NPOC, TIC	TC, NPOC, TIC
working range	≤ 10 ppm	≤ 50 ppm
detection limit	< 3 ppb (blank value)	< 15 ppb (calibration)
analysis time	4 - 6 min.	4 - 6 min.
sample inlet	2 ports	1 port
sample volume	10-20 mL (loop)	1- 20 mL (syringe)
calibration	two points	multipoint
reagent	reagent free operation configurable	mixed reagent
carrier gas	compressed air nitrogen, oxygen	nitrogen, oxygen compressed air
operation	IPC, 10" TFT touchscreen	IPC, ext. Monitor
data access	USB, Net work	USB, Net work
option: uniTOC- process	SST acc.; USP/Ph.Eur CFR 21 Part 11 conform	
power supply	230 VAC, 120 W	230 VAC, 80 W
degree of protection	IP 54 (IP 64)	IP 30
dimensions	400x220x600 mm	400x220x600 mm
weight	ca.20 kg	ca. 15 kg

Control
you need...



uniTOC- instruments meet the international norms

Depending on the model, all international norms and regulations are fulfilled like :

- EN 1484,
- DIN 32 645,
- DIN 38 402,
- ISO 8245,
- US Pharmacopeia 25 (643)
- Pharmacopeia European 2.2.44

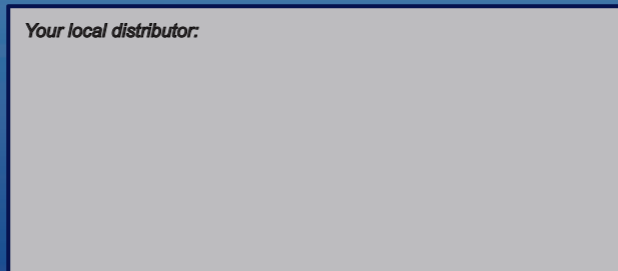
All information is subject to change without further notice.

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uniTOC- systems - precise TOC determination

uniTOC-systems - the precise high definition instruments for the online determination of TOC from drinking water to ultra pure water.

Two innovative instruments **uniTOC-online** and **uniTOC-lab** combine high end analytical components according to DIN EN. The graphical control with the 10" touchscreen display and the data management of the control and analysis software fulfill all international standards for the determination of TOC.

The instruments are designed for monitoring i.e. process water in the pharmaceutical industry, microelectronics, chemistry as well as the production of potable water or ultra pure water.

membraPure provides with the uniTOC-analyzers the perfect instruments to meet the demands of the existing regulations.



uniTOC- Advantages

All fluidic lines of the instruments are manufactured by materials of highest purity like PEEK, PFA or PTFE with almost no dead volumes.

Dosage of samples is accomplished by a corrosion free peristaltic pump.

Two inlets offer double capacity for the sample uptake and TOC measurements.

UV radiation is generated by a high energy, low pressure UV lamp, which guarantees a lifespan longer than 12 months.

The CO₂ concentration is measured with a NDIR detector system - CO₂ selective, sample temperature independent

An internal PC with touch screen operation controls and registers all instrument parameters - allows the on-line visualization of the TOC value trend.

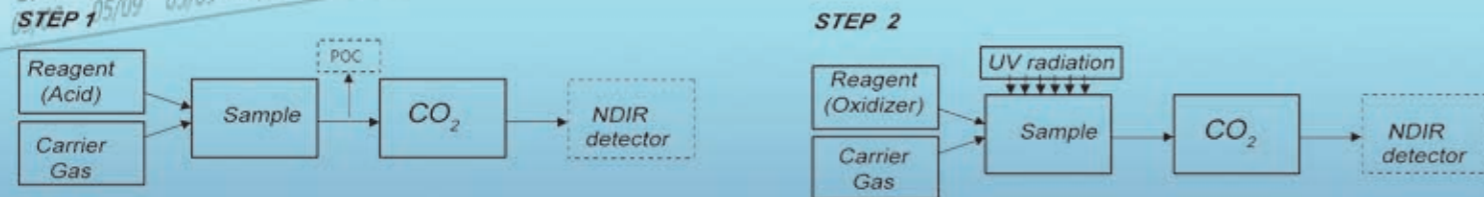
uniTOC instruments - the principle of operation

Both instruments use the UV/persulfate oxidation procedure followed by NDIR measurement. Dependent on the sample consistency the oxidation process can even be performed reagent-free.

The typical application fields of the uniTOC systems allow the dosage of larger volumes of sample, which guarantees high reproducibility of results as well as a high sensitivity. During standard operation, the on-line measurements have short measuring times. The continuous self-cleaning procedure of the reactor avoids any cross-contaminations. Since the quality of the sparging gas can be low, the use of pressurized air is standard.

The non-dispersive infrared detector system is absolutely selective to carbon dioxide and therefore independent of the sample matrix. The setup of the instruments allow the determination of total inorganic carbon (TIC) and the total organic carbon (TOC) content from the same sample. These measurements are independent of the sample temperature.

SCHEME OF ANALYTICAL PROCESS



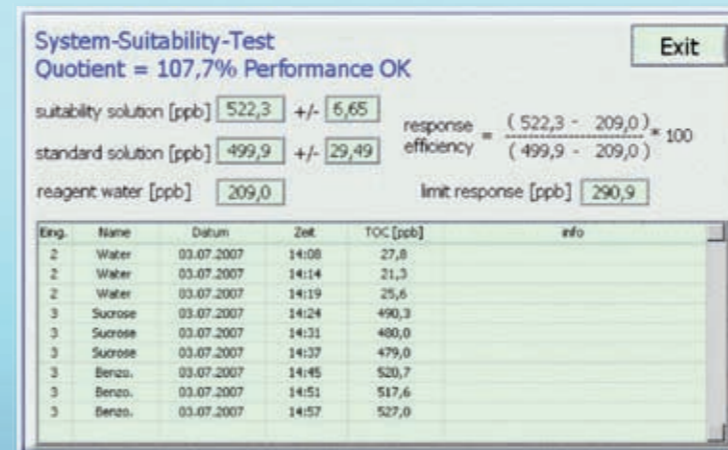
uniTOC- Analysis Method

<p>TC – Total Carbon</p> <p>The total carbon concentration of the sample is the sum of the inorganic carbon and organic carbon content. In the uniTOC instruments, inorganic and organic carbon are measured separately.</p>	
<p>TIC – Total Inorganic Carbon</p> <p>The sample is acidified and the dissolved CO₂ and the ionic carbonate is sparged with the carrier gas as carbon dioxide into the NDIR detection cell and measured.</p> <p>Scheme – Step 1</p>	<p>TOC - Total Organic Carbon</p> <p>TOC is measured as NPOC – Non-Purgable Organic Carbon. After sparging the TIC from the sample, the remaining organic carbon content is transformed to CO₂ by UV radiation or the UV/persulfate oxidation procedure.</p> <p>Scheme – Step 2</p>

uniTOC- system validation

TOC determination requires calibration (two- or multipoint calibration) as well as linearity check to be performed in order to prove the correctness of the measured values. After installing the standard solutions, the instruments perform these checks automatically and calculate the limiting values.

For pharmaceutical use, the software allows the automated System Suitability Test (SST).



Automized System Suitability Test - SST

The verification of the TOC results according to requirements of USP and Ph.Eur are realized by the frequent performance of the System Suitability Test.

The oxidation efficiency ("response efficiency") of a hard to oxidize substance (benzoquinones) compared to an easily oxidizable substance (sucrose) must be within a range of 85 % to 115 %.

The software of the uniTOC instruments allows the automatic procedure and data evaluation of the test.

Monitoring extreme low TOC concentrations

The models uniTOC-online and uniTOC-process are conceived for pure and ultra pure water monitoring in industrial and pharmaceutical applications.

The figures show the results of online-measurements of pure water with TOC concentrations in the lowest range down to 0,5 ppb.

conditions: CO₂-selective NDIR-detection after UV-oxidation

carrier gas: CO₂-free compressed air

online-measurement of pure water

