

1.14878.0001  
1.14879.0001

## Spectroquant® TOC Cell Test

# TOC

### 1. Definition

The term TOC (Total Organic Carbon) is used to describe the total content of organically bound carbon in dissolved and undissolved compounds.

The TOC content is expressed in mg/l.

### 2. Method

By digestion with sulfuric acid and peroxodisulfate, carbon-containing compounds are transformed into carbon dioxide. This reacts with an indicator solution, the color of which is determined photometrically.

Inorganically bound carbon (dissolved carbon dioxide and anions of carbon dioxide) is expelled in gaseous form beforehand by acidification.

**The digestion is analogous to APHA 5310 D.**

### 3. Measuring range and number of determinations

Cat. No.	Measuring range mg/l TOC	Number of determinations
114878	5.0 - 80.0	25
114879	50 - 800	

For programming data for selected photometers / spectrophotometers see [www.service-test-kits.com](http://www.service-test-kits.com).

### 4. Applications

This test measures the total content of organically bound carbon.

#### Sample material:

Groundwater and surface water

Drinking water

Production control

Wastewater

This test is **not suited** for seawater.

### 5. Influence of foreign substances

This was checked in solutions containing 50 (Cat. No. 114878) or 500 (Cat. No. 114879) and 0 mg/l TOC. The determination is not yet interfered with up to the concentrations of foreign substances given in the table.

Concentrations of foreign substances in mg/l or %				
	114878	114879	114878	114879
Ca <sup>2+</sup>	200	1000	TIC <sup>1)</sup>	25
Mg <sup>2+</sup>	200	1000	NaCl	0.5 %
NH <sub>4</sub> -N	100	1000	NaNO <sub>3</sub>	10 %
			Na <sub>2</sub> SO <sub>4</sub>	10 %

<sup>1)</sup> Total Inorganic Carbon; the tolerable values can be raised **by a factor of four** when the sample is stirred **for 60 min** (see section 8).

### 6. Reagents and auxiliaries

#### Please note the warnings on the packaging materials!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

#### Package contents:

1 bottle of reagent TOC-1K

1 bottle of reagent TOC-2K

25 reaction cells

1 sheet of round stickers for numbering the cells

#### Also required:

Aluminium caps ("Screw caps for TOC digestion", 6 pcs), Cat. No. 173500

#### Other reagents and accessories:

MColorpHast™ Universal indicator strips pH 0 - 14, Cat. No. 109535

Sulfuric acid 0.5 mol/l TitriPUR®, Cat. No. 109072

MColorpHast™ pH-indicator strips pH 0 - 6.0, Cat. No. 109531

Water for chromatography LiChrosolv®, Cat. No. 115333

TOC standard solution CertiPUR®, 1000 mg/l TOC, Cat. No. 109017

Pipettes for pipetting volumes of 1.0, 3.0, and 9.0 ml

Thermoreactor

### 7. Preparation

- Analyze immediately after sampling.
- The pH must be within the range 2 - 12**  
Adjust, if necessary, with sulfuric acid.

### 8. Procedure

	114878	114879	
Pretreated sample (10 - 30 °C)	25 ml	1.0 ml	Place into a suitable glass vessel.
Distilled water <sup>1)</sup>	-	9.0 ml	Add and mix.
Reagent TOC-1K	3 drops <sup>2)</sup>	2 drops <sup>2)</sup>	Add and mix. <b>The pH must be below 2.5.</b> Check with pH-indicator strips. Adjust the pH, if necessary, with sulfuric acid.
Stir for 10 min at medium speed.			
Stirred sample	3.0 ml	3.0 ml	Pipette into a reaction cell.
Reagent TOC-2K	1 level grey microspoon (in the cap of the TOC-2K bottle)	1 level grey microspoon (in the cap of the TOC-2K bottle)	Add.
<b>Immediately</b> close the cell tightly with an <b>aluminium cap</b> . Heat the cell, <b>standing on its head</b> , at 120 °C in the preheated thermoreactor for 120 ± 5 min. Leave the closed cell, <b>standing on its head</b> , to cool in a test-tube rack <b>for 60 min (cooling time)</b> . <b>Do not cool with cold water!</b> After cooling, turn the cell upright and measure in the photometer <b>within 10 min</b> .			

<sup>1)</sup> It is recommended to use water for chromatography LiChrosolv®, Cat. No. 115333.

<sup>2)</sup> **Hold the bottle vertically while adding the reagent!**

#### Notes on the measurement:

- The measurement accuracy can be increased by measuring against a separately prepared blank (preparation as per measurement sample, but with distilled water instead of sample).
- When the sample is stirred for 60 min, the determination is still not interfered with even in the case of TIC contents of up to 100 mg/l (Cat. No. 114878) or, respectively, up to 1000 mg/l (Cat. No. 114879).**
- For photometric measurement the cells must be clean.  
Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-low readings.
- After the measurement remove the aluminium cap from the cell and replace by the screw cap. **After cleaning with distilled water and drying**, the aluminium cap can be used for further determinations.

### 9. Analytical quality assurance

recommended before each measurement series

To check the photometric measurement system (test reagents, measurement device, handling) and the mode of working, a dilute TOC standard solution containing 50 mg/l TOC (for Cat. No. 114878) or, respectively, 500 mg/l TOC (for Cat. No. 114879) can be used. This standard solution must be analyzed **as described in section 8**.

Sample-dependent interferences (matrix effects) can be determined by means of standard addition.

Additional notes see under [www.qa-test-kits.com](http://www.qa-test-kits.com).

#### Characteristic quality data:

In the production control, the following data were determined in accordance with ISO 8466-1 and DIN 38402 A51:

	114878	114879
Standard deviation of the method (mg/l TOC)	± 0.85	± 10.3
Coefficient of variation of the method (%)	± 2.0	± 2.4
Confidence interval (mg/l TOC)	± 2.1	± 25
Number of lots	36	23

#### Characteristic data of the procedure:

	114878	114879
Sensitivity: Absorbance 0.010 A corresponds to (mg/l TOC)	0.6	6
Accuracy of a measurement value (mg/l TOC)	max. ± 3.7	max. ± 41

For quality and batch certificates for Spectroquant® test kits see the website.

### 10. Notes

- Reclose the reagent bottles immediately after use.
- Information on disposal can be obtained at [www.disposal-test-kits.com](http://www.disposal-test-kits.com).**

