Total Organic Carbon (TOC) Analysis of Cement Powders using the Lotix with LSS Boat

Application Note

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The Ability to Handle Nearly Any TOC Sample

By combining the LSS Boat with the Lotix TOC Combustion Analyzer, analytical options increase exponentially. The LSS can handle liquid samples as well as difficult TOC samples like soil, sand, sediment, sludge, and particulate-laden liquid. Using the difficult sample matrix of cement powder, this application note will demonstrate the Lotix/LSS's ability to determine both Total Organic Carbon (TOC) and Total Carbon (TC) content.

Figure 1 LSS Boat and Lotix

The Importance of TOC Analysis for Cement

TOC determination is used as a quality control measure of cement powders for the manufacture of cement. This study was based on method EN 13639 - "Determination of TOC in Limestone" by furnace oxidation, followed by infrared detection.

The Simplicity of Analysis Using the LSS Boat

Samples analyzed for TC content required no sample preparation. When analyzing for TOC content, a few drops of 1:1 Nitric Acid and deionized water solution were added to each sample to remove any Inorganic Carbon (IC) that may be present.

1. A sample schedule using the default "Solids" method was created in the TOC TekLink software. The furnace temperature parameter was set to 900 °C.
2. A mid-range liquid calibration standard was added as a check standard at the beginning and end of the sample schedule to ensure the accuracy of the results.

Table I TOC Sample Results (n=3)

	ppmC	%RSD
Cement Sample 1	1445.77	2.13
Cement Sample 2	1218.62	5.63

Table III TC Sample Results (n=3)

Cement Sample 1	2766.14	5.04
Cement Sample 2	1866.20	5.73

Table II Carbon Standards Results (n=3)

ppmC	%RSD
0.00	5.13
1,000.00	0.53
4,000.00	0.56
10,000.00	1.43
20,000.00	2.37
Linear Curve y=563.925x+3261.778 Coefficient of Correlation (r^2): 0.99974	

3. Quartz boats with either 50 mL of standard or 50 mg of solid samples were placed in the LSS sample injector.
4. When prompted by TOC TekLink, the volume/weight of the sample was input. Once entered, the sample was automatically moved to the combustion furnace for analysis. The concentration of the sample was then calculated against the calibration curve.

Reliable Accuracy and Precision

As these results show, the Lotix/LSS Boat was capable of analyzing this difficult sample matrix for determination of TOC and TC content with minimal effort.

See how the Lotix/LSS can expand your analytical options! Contact your sales representative at 1.800.874.2004 or visit http://www.teledynetekmar.com/contact/sales-contacts.

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