Hach BioTector B7000 ITA Field Test, USA

"Online Total Organic Carbon (TOC) Analyzers for Industrial Wastewater: **A Performance Evaluation"**

BioTector

PUBLISHED IN 2013

Overview of the **ITA Test Report**

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THE TEST SITE

5 Online TOC (Total Organic Carbon) Analyzers were field tested at an industrial wastewater treatment plant: Gulf Coast Waste Disposal Authority (GCWDA), Bayport Facility. This facility has a capacity of 30 million gallons per day and treats industrial waste from approximately 65 customers, predominantly petrochemical.

The Field Test report states that TOC analysis, as an alternative to BOD_5, COD and TOD, is a more cost-effective, accurate and timely test with less interferences and the ability to provide process control and real-time monitoring.

Due to the diversity of customers that discharge to this plant, TOC concentrations can experience a large variation over a very short time. Concentrations range from 490mg/L to 1020 mg/L and occasionally a sample could contain high VOCs or high TSSs.

GCWDA conducts approximately 66 TOC analyses in their laboratory per day and use TOC measurements for two main reasons:

1. **To monitor influent, conduct process control and detect waste loading upsets**
2. **To monitor wastewater characteristics of each customer**

The evaluation of Online TOC Analyzers by the GCWDA was due to their "...keen interest in the ability to continuously monitor TOC concentration in an industrial wastewater treatment application to benefit from having more timely information for enhanced process control and a reduction in labour requirements.".

We would encourage any reader to obtain and read a copy of the full ITA report for more in-depth information
www.instrument.org

TEST BACKGROUND

Field tests were conducted from April to July 2011, a total of 17 weeks. The two main categories of evaluation were:

1 Laboratory Conformance

Measurements were used once each day to compare with online analyzer measurements thereby demonstrating the overall ability and accuracy of the instrument when subjected to many fluctuating and challenging sample variations – as experienced in real-time monitoring conditions.

2 Instrument Performance

Test results also provide information regarding instrument design features, instrument support systems including sampling, conditioning and cleaning systems that play an important role in the performance, reliability and maintenance requirements of an analyzer in industrial applications.

The TOC analyzers experienced situations including power outages, personnel changes and severe weather conditions which allowed the test to observe and note how each analyzer held up to real-life application.

ACCREDITATION

Biotector TOC analysis complies with the following standards:

- **DIN-EN1484**
- **US EPA 415.1**
- **ASTM D5173**: 97(2007) Standard Test Method for On-Line Monitoring of Carbon Compounds in Water by Chemical Oxidation, by UV Light Oxidation, by both, or by High Temperature Combustion followed by Gas Phase NDIR or by Electrolytic Conductivity.
- **DIN 38409-H3**
- **ISO 8245**

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THE RESULT

The ITA did not state conclusively which analyzer had shown greatest accuracy and reliability after the test, stating that the report "... does not conclude or select one instrument over the other since each treatment facility's circumstances will determine the selection of the best instrument for their application".

However, two months after completion of the test, GCWDA placed an order for the Hach BioTector B7000 at their Bayport facility. BioTector is the only Online TOC Analyzer installed at this facility.

PERFORMANCE OVERVIEW

Hach BioTector B7000 was clearly the best performer in both categories of evaluation attaining both the highest laboratory conformance and lowest maintenance requirements in the group of 5 Online Analyzers.

1 LABORATORY CONFORMANCE

The Hach BioTector B7000 performed best in the group for this category – 21.2 percentage points above the group average. However, our accuracy levels would typically be much higher. Our analyzers give a consistently high performance in harsh applications with the unparalleled combination of 99.86% MCERTS certified uptime and typical accuracy and repeatability of better than ± 3% of reading. Factors affecting accuracy levels during this test were:

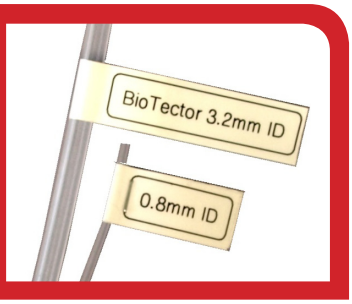
Blockage At the Bayport facility

There was a build-up of sludge in the site that would occasionally cause the external sample pipe to clog and cut off the sample flows to all analyzers. When this occurred, the Hach BioTector B7000 analyzer detected it and logged it in the data file. Therefore the analyzer gave some low readings due to insufficient sample volumes.

Filtration

The outliers above the upper control limit are potentially due to the fact that, with large bore tubing of 3.2mm (where many others typically use 0.5mm to 0.8mm), the Hach BioTector B7000 can include particulates in the measurement therefore making it a more representative result. Many laboratory measurements use filters to prevent these particulates from blocking their analyzers and accuracy can, therefore, be diluted.

BIOTECTOR TECHNOLOGY ALLOWS FOR **LARGER SAMPLE TUBING THAN OTHER TOC ANALYZERS.**



2 INSTRUMENT PERFORMANCE

Hach BioTector B7000 performed best in the group for this category also. Our maintenance requirements were the lowest in the group – 62% lower than the group average. We would typically experience even less maintenance events on our client sites where a Hach BioTector Analyzer requires only one routine service every 6 months.

4 of the 7 maintenance events recorded were to change the Reagents

Due to the regularly high TOC levels in this sample stream, the Bayport team changed Reagents every 3 weeks. Since this test in 2011, our analyzers have been further enhanced to require lower Reagent use.

The remaining 3 maintenance events related to replacing the sample tube in the sample pump

As the full report details, the site sample was quite difficult and contained high levels of volatiles. So, as a precaution, the engineer replaced this tube once each month. It was best to be cautious, changing the tube once a month was a simple 5 minute exercise and overcame the possibility of a tube splitting due to unusually harsh samples. It is extremely rare to require a tube change more frequently than our recommended 6 month interval.

Hach BioTector B7000 maintenance events relate to consumables rather than actual system failures. The full ITA report details issues encountered by the other 4 analyzers including clogging, leaks, calibrations and, in one case, changing their failed CO2 analyzer.

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THIS OVERVIEW IS JUST A SNAPSHOT OF THE RIGOROUS 4 MONTH TESTING PROCESS CONDUCTED AT THE BAYPORT FACILITY. WE WOULD STRONGLY RECOMMEND READING THE FULL ITA REPORT IN ORDER TO BENEFIT FROM THE DETAILED OBSERVATIONS OF THE ITA AND GCWDA DURING THIS FIELD TEST WWW.INSTRUMENT.ORG

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Established in Ireland in 1995, BioTector Analytical Systems Ltd is a privately-owned company with over 1,000 installations in more than 40 countries worldwide.

Our award-winning, patented technology has given BioTector Analyzers an international reputation for high performance with unparalleled accuracy and reliability combined. So our clients can use BioTector TOC measurement data with total confidence.

For local sales & support, details of our international distribution network can be found on **www.biotector.com**

BioTector

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