



Application Note

On-line TOC Analysis



On-line TOC Analysis For Difficult Applications

A global leader in energy and petrochemicals selects the BioTector B7000 TOC Analyser after a six-year search

Overview

After six years of searching, a joint oil refinery and chemical manufacturing site in the Netherlands selected the BioTector B7000 TOC Analyser for its difficult online application. The BioTector B7000 uses a unique oxidation method, based on hydroxyl radicals. Its proven ability to operate successfully, even in the most difficult applications, sets it apart from other TOC analysers currently on the market.

The Project

The project had as its directive the identification of a Total Organic Carbon (TOC) analyser that would give reliable results in an application having both high calcium and high salts concentrations. Most of the instruments that were tested failed after only a few hours operation as a result of these conditions. Two and a half years after starting the project, the BioTector was taken for testing and to the company's surprise continued to run where all other analysers failed. Further tests were carried out and the BioTector was finally approved as the only instrument that successfully met its stringent requirements.

The tests were carried out at a epichlorohydrin (ECH) processing facility. ECH is an intermediate product made from cracked oil. ECH strippers are used in the manufacturing process. Effluent from the strippers is monitored online by the BioTector TOC analyser. The effluent contains a mix of particulate components, together with Cl-based chemical structures, this is a difficult combination for any TOC analyser.



The standard procedure for TOC measurement has as its first step the removal of all inorganic carbons (IC), leaving only the organic carbons (OC) in the sample. This is normally achieved by lowering the pH in the sample and using a stripper gas to remove the CO₂ that is formed.

Normally, the BioTector uses sulphuric acid (H₂SO₄) to remove the IC. Sulphuric acid, however, reacts with calcium to form gypsum (CaSO₄), which builds up into a stone-hard sediment within the analyser. To avoid this, for this specific application the BioTector uses hydrochloric acid (HCl).

High concentrations of salts and the use of hydrochloric acid combine to create a highly aggressive environment. To avoid corrosion of the stainless steel reactor standard in the BioTector, a new reactor made of Teflon PFA (per fluor alkoxy) was specially made for this application and is now commercially available as an optional feature of the BioTector.

The BioTector was further fitted with an air purge system and certified for EExp Zone 2 use as it was to be installed in a hazardous area.

The Results

Final tests on the BioTector's online operational reliability and accuracy were completed and the BioTector TOC analyser was approved as the recommended system for all facilities of this company.

The testing and resultant modifications of the BioTector developed in co-operation with the customer took three years.

The experience gained from the tests and the modifications introduced have resulted in a superior product to the benefit of all users of online TOC analysers worldwide. This project proves that it is possible to carry out reliable online TOC analysis even in the most difficult industrial environments.

