# Product Leadership Award
# Water and Wastewater Analytical Instrumentation
# United States, 2012

## Frost & Sullivan's Global Research Platform

Frost & Sullivan is in its 50th year of business with a global research organization of 1,800analysts and consultants who monitor more than 300 industries and 250,000 companies. The company's research philosophy originates with the CEO's360-Degree Perspective™, which serves as the foundation of its TEAM Research™ methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2012 United States Product Leadership Award in the Water and Wastewater Analytical Instrumentation market to BioTector Analytical Systems Ltd.

## Significance of the Product Leadership Award

### Key Industry Challenges

Penetrating the Water and Wastewater Analytical Instrumentation market with new and unknown technologies poses a daunting challenge for players in this market space. The two technologies typically used to monitor total organic carbon (TOC) in water and wastewater streams included thermal technology and UV persulfate, that is until BioTector Analytical Systems introduced its patented, two-stage advanced oxidation (TSAO) technology. The company penetrated the market successfully by employing its technology in traditionally difficult applications around the United States, like in the Oil Refining and Petrochemical industry in Texas, for example. Through Best Practices and a compelling word-of-mouth reputation BioTector Analytical Systems successfully developed robust organic growth across the U.S.

### Key Benchmarking Criteria for the Product Leadership Award

For the Product Leadership Award, the following criteria were used to benchmark BioTector Analytical Systems' performance against key competitors:

- **Product Features/Functionality**

- **Innovative Element of the Product**

- **Product Acceptance in the Marketplace**

- **Provides Customer Value Enhancements**

- **Product Quality**

## Decision Support Matrix and Measurement Criteria

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Matrix (DSM). The DSM is an analytical tool that compares companies' performance relative to each other with an integration of quantitative and qualitative metrics. The DSM features criteria unique to each Award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. Fundamentally, each DSM is distinct for each market and Award category. The DSM allows our research and consulting teams to objectively analyze each company's performance on each criterion relative to its top competitors and assign performance ratings on that basis. The DSM follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are shown in Chart1.

### Chart1: Performance-Based Ratings for Decision Support Matrix



9–10  Excellent

7–8  Good

4–6  Fair

1–3  Poor
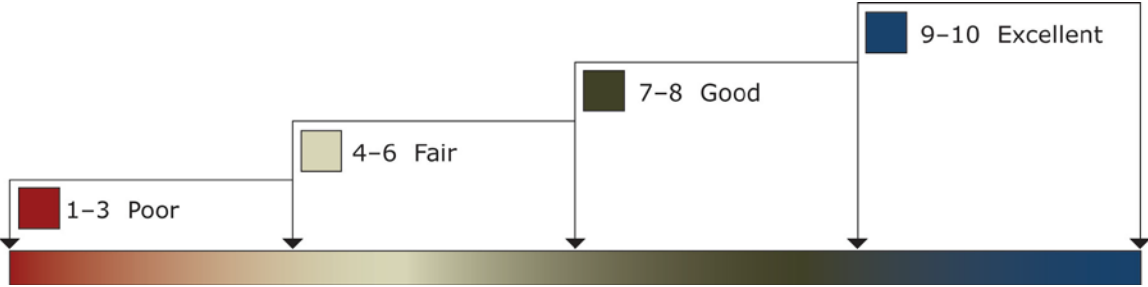
This exercise encompasses all criteria, leading to a weighted average ranking of each company. Researchers can then easily identify the company with the highest ranking. As a final step, the research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

### Chart2: Frost & Sullivan's 10-Step Process for Identifying Award Recipients



**STEP 1** Analyze Industry Challenges and Opportunities

**STEP 2** Confirm Award Categories of Relevance and Importance

**STEP 3** Establish Award Criteria

**STEP 4** Develop Best Practice Research Instruments

**STEP 5** Conduct Best Practice Research with Industry Value Chain Players

**STEP 6** Attribute Relative Weights for Criteria

**STEP 7** Nominate Top 3 companies for award

**STEP 8** Determine ratings for each company across criteria

**STEP 9** Complete ratings for all criteria and companies

**STEP 10** Identify recipient company based on final weighted average rating

## Best Practice Award Analysis for BioTector Analytical Systems Ltd.

The Decision Support Matrix, shown in Figure 3, illustrates the relative importance of each criterion for the Product Leadership of the Year Award and the ratings for each company under evaluation. To protect the interests of the award recipient's competitors, we have chosen to refer to them as Competitor 1 and Competitor 2.

**Figure 3: Decision Support Matrix for Product Leadership Award**

| Measurement of 1–10 (1 = lowest; 10 = highest) | Award Criteria | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Features/Functionality | Innovative Element of the Product | Product Acceptance in the Marketplace | Provides Customer Value Enhancements | Product Quality | Weighted Rating |
| **Relative Weight (%)** | 20% | 20% | 20% | 20% | 20% | 100% |
| BioTector Analytical Systems Ltd | 10 | 9 | 9 | 8 | 9 | 9.0 |
| Competitor 1 | 6 | 6 | 7 | 6 | 8 | 6.6 |
| Competitor 2 | 6 | 5 | 6 | 6 | 7 | 6.0 |

**Criterion 1: Product Features/Functionality**

BioTector Analytical Systems' TOC analyzer uses a patented, two-stage advanced oxidation (TSAO) technology that manages extremely challenging applications involving fats, oils, greases, salts, sludge, and particulates. The advanced oxidation technology is truly unique and it is capable of measuring salt levels up to 30 percent and calcium levels up to 12 percent in water and wastewater streams.

TOC analyzers currently available in the market primarily work on two technologies: thermal and UV persulfate. However, high levels of calcium and salt in water and wastewater can lead to system failures in TOC analyzers that use thermal technology. These system failures happen primarily due to the collection of material in the furnace, which acts as an accumulator for all sample constituents not converted to gas during the thermal oxidation process.

In TOC analyzers that use UV persulfate technology, salt concentrations as low as 0.05 percent

reduces the persulfate oxidation potential. Most of the analyzers available on the market today need to be shut down while cleaning oils, fats, and greases or they lose measurements for an estimated 12 to 24 hours during the cleaning process.

BioTector Analytical Systems' TOC analyzer automatically self-cleans all parts of the analyzer, which has come in contact with the sample, during every measurement cycle and without the need of an external cleaning agent. Oversized tubing coupled with the self-cleaning capability of the analyzer eliminates the need for filtration and it prevents clogging and sample contamination. The BioTector TOC analyzer requires no calibration between six-month service intervals.

**Criterion 2: Innovative Element of the Product**

BioTector Analytical Systems' patented self-cleaning oxidation technology has overcome the traditional problems associated with online measurement, some of which include analyzing large samples and reliable measurement of samples containing greases, fats, oils, salts, and particulates. The BioTector TOC analyzer has a certified uptime of 99.86 percent and an accuracy of plus or minus 3 percent of reading. BioTector's TOC analyzer requires maintenance every six months, while most other analyzers on the market have constant weekly maintenance requirements, with some annual maintenance costs ranging from $30,000 to $50,000. The annual maintenance costs for the company's TOC analyzers are in the range of $2,000 to $2,500, which is significantly less than most products available in the marketplace.

**Criterion 3: Product Acceptance in the Marketplace**

BioTector Analytical Systems is reputed for traveling outside the confines of traditional 'end-user markets' in search of untapped niche markets. The company targets industrial process applications, and its analyzers are strong enough to survive in acerbic industrial environments. Most of the companies in the market focus on municipal water and wastewater effluent streams. However, BioTector Analytical Systems has gained product acceptance in industrial markets, including the Petrochemical industry, Oil and Gas, Pharmaceutical, Airports, and Food and Beverage, among others.

BioTector Analytical Systems is constantly seeking new avenues for its acclaimed products. As part of the company's continued effort to gain market share, BioTector constantly develops add-on value services and it extends its product line to accommodate ever-evolving needs in the marketplace.

This product and market development strategy has enabled BioTector Analytical Systems to become a market leader with an estimated 25–30 percent share of the TOC Water and Wastewater Analytical Instrumentation market. BioTector is a highly effective role model for product leadership.

**Criterion 4: Provides Customer Value Enhancements**

BioTector Analytical Systems' products have successfully addressed end-user needs. For example, the Petrochemical industry employs a number of experts that are trained and accustomed to using analyzers. However, the Food and Beverage industry does not have the same level of experience among its users. Food and Beverage end-users need easy-to-use, simplified analyzers. In order to cater to these diverse needs, BioTector Analytical Systems has designed a number of key diagnostics applications using simple menu structures in its analyzers. The analyzer actually tells the customer if something is wrong, providing the customer with enough time to order spare parts. The BioTector TOC analyzer is housed in an enclosure with dual compartments to keep all electronic components separate from the "wet" or analysis section. This housing arrangement enables the analyzer to withstand corrosive environments as well.

**Criterion 5: Product Quality**

BioTector Analytical Systems, through its innovation in product strategy, has virtually overtaken all of its competitors by providing best-in-class products. Biotector's TOC analyzers offer a multitude of advantages including:

- Self-cleaning capability

- Six-month calibration intervals (most other products in the market require calibration every two to three days)

- Not affected by algae growth

BioTector Analytical Systems also offers total phosphorus (TP) and total nitrogen (TN) analyzers. The company provides a TOC, TN, and TP analyzer that allows online TOC/TN, TOC/TP and TOC/TN/TP measurements amalgamated in one instrument.

The biggest advantage found with BioTector's analyzers is its reliability. If end-users employ an analyzer to save money, it needs to be extremely reliable and robust. So instead of using it as a regulatory analyzer, customers are using it as a process-monitoring analyzer. Since the analyzer has to handle fats, oils, and greases, it needs to be abundantly reliable. For example, BioTector's patented oxidation technology is able to handle very difficult, dirty material that has particulates and oil in it, which usually tends to clump, better than most analyzers on the market.

## Conclusion

By combining strategic business expansion with product innovation, BioTector Analytical Systems has successfully achieved a strong market position. The company has also tapped into industries that exhibit promising growth potential for TOC analyzers by

utilizing best practices and through its compelling reputation. Based on Frost & Sullivan's independent analysis of the U.S. Water and Wastewater Analytical Instrumentation market, BioTector Analytical Systems Ltd. is recognized with the 2012 Product Leadership Award.

## The CEO 360-Degree Perspective™- Visionary Platform for Growth Strategies

The CEO 360-Degree Perspective™ model provides a clear illustration of the complex business universe in which CEOs and their management teams live today. It represents the foundation of Frost & Sullivan's global research organization and provides the basis on which companies can gain a visionary and strategic understanding of the market. The CEO 360-Degree Perspective™ is also a "must-have" requirement for the identification and analysis of best-practice performance by industry leaders.

The CEO 360-Degree Perspective™ model enables our clients to gain a comprehensive, action-oriented understanding of market evolution and its implications for their companies' growth strategies. As illustrated in Chart 4 below, the following six-step process outlines how our researchers and consultants embed the CEO 360-Degree Perspective™ into their analyses and recommendations.

**Chart 4: CEO's 360-Degree Perspective™ Model**

## Critical Importance of TEAM Research

Frost & Sullivan's TEAM Research methodology represents the analytical rigor of our research process. It offers a 360-Degree view of industry challenges, trends, and issues by integrating all seven of Frost & Sullivan's research methodologies. Our experience has shown over the years that companies too often make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Frost & Sullivan contends that successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. In that vein, the letters T, E, A and M reflect our core technical, economic, applied (financial and best practices) and market analyses. The integration of these research disciplines into the TEAM Research methodology provides an evaluation platform for benchmarking industry players and for creating high-potential growth strategies for our clients.

**Chart 5: Benchmarking Performance with TEAM Research**
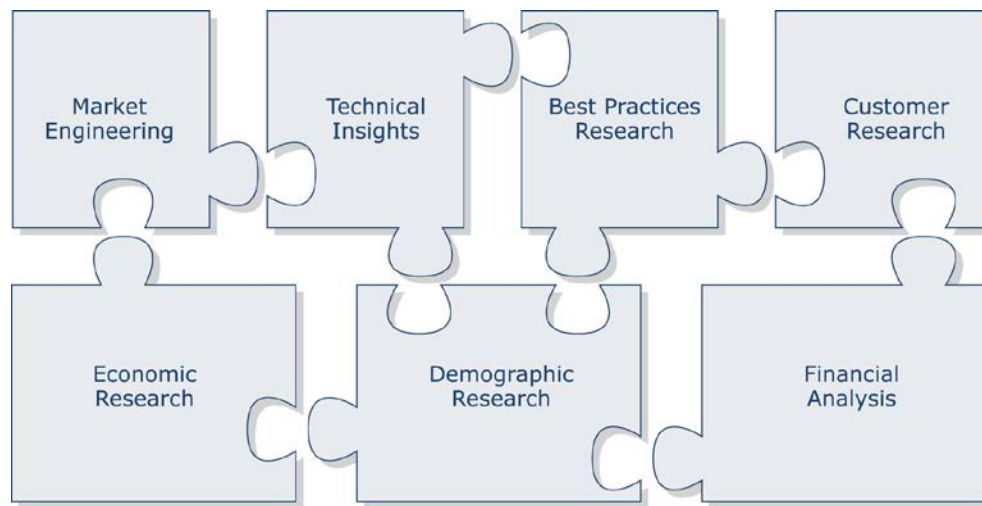


## About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best-practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from more than 40 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.