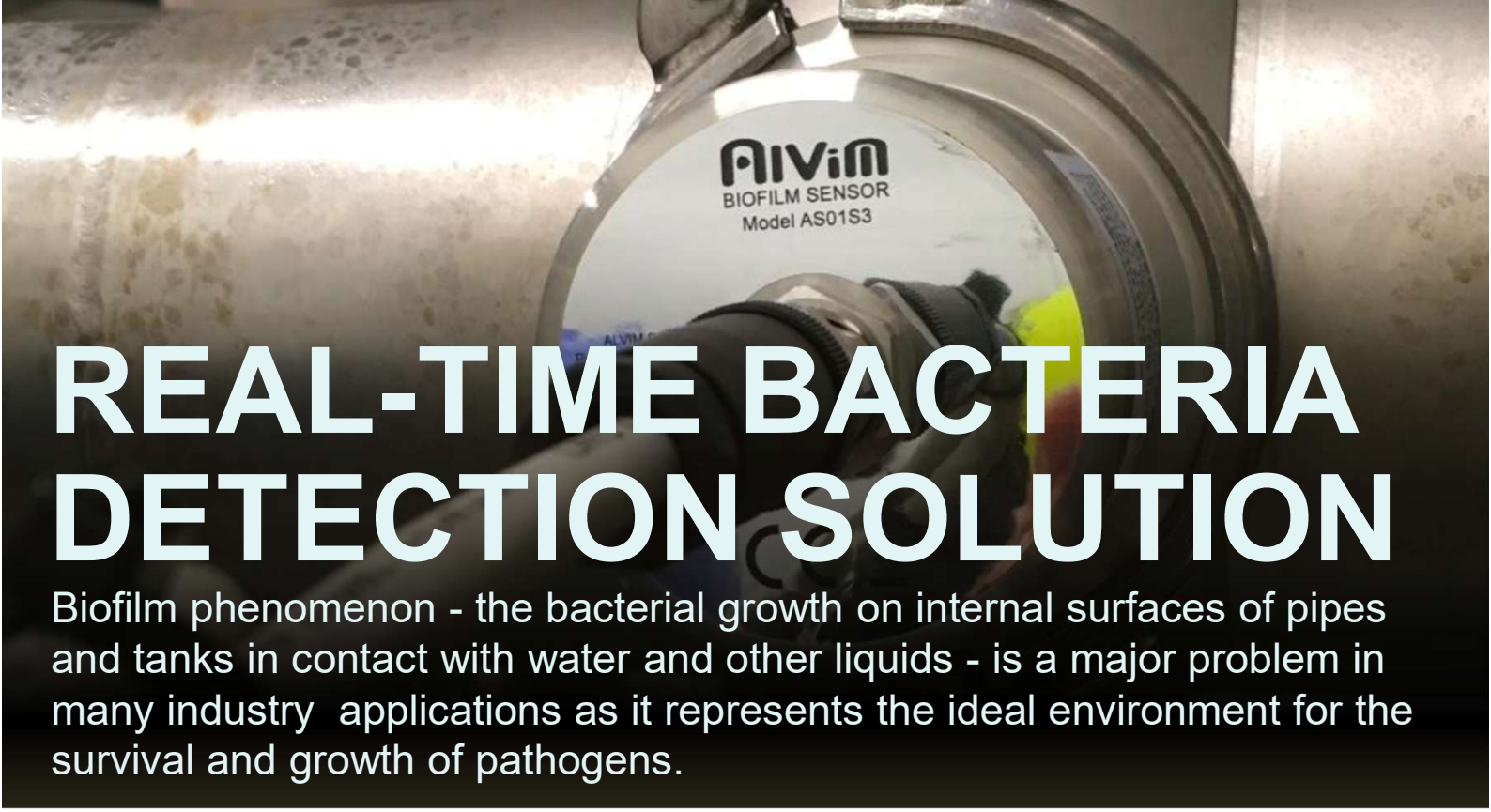

REAL-TIME BACTERIA DETECTION SOLUTION

Biofilm phenomenon - the bacterial growth on internal surfaces of pipes and tanks in contact with water and other liquids - is a major problem in many industry applications as it represents the ideal environment for the survival and growth of pathogens.

We are Industry 4.0 and Business Enhancement experts: our 24x7 digital online-monitoring solution allows to effectively prevent the biofilm growth: our technology exploits the natural aquatic biochemical activity (BES – Biological Electrochemical Signal) directly indicating the surface area covered with bacteria. By establishing our system, it is possible on the basis of timely and valid data and information, to initiate adequate measures aimed at improvement in the areas of product safety, energy efficiency, maintenance of critical infrastructure, information security and profitability of your business.

Bacterial biofilm development in fluid environment causes corrosion, equipment failure, energy loss, reduced performance, increased energy consumption and resistance to antimicrobial treatments.

Problems caused by biofilm can eventually lead to pipe blockage and plant idle. Sanitation treatments should be applied as soon as biofilm starts to grow, since it is much more difficult and expensive to kill a mature biofilm since it has a thicker EPS matrix, thus it is much more resistant than an early- stage one.

When biofilm is mature, its outermost layers tend to detach and float away. This increases the likelihood of biofilm training in other areas of the plant.

Standard laboratory analysis and bacteria detection kits present many limitations like being time consuming and un-representative of the real abundance of bacteria since most bacteria live in biofilm and not free in the fluid – less than 1% of the bacteria present in the sample will grow in lab conditions.

It is therefore important to immediately contrast biofilm formation so to minimize the risk of dangerous bacterial contamination.

Our real-time monitoring solution provides the following benefits:

- Early Warning/ detection of bacterial biofilm growing on pipelines, tanks or heat exchangers
- Optimization of cleaning treatments
- Easy to install and easy to operate
- Virtually Maintenance Free
- Real time continuous biofilm monitoring
- High Sensitivity
- Modular Scalable system

EGIDION
innovate | incubate | industrialize

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Our real-time biofilm monitoring solution is projected for the following use cases and industry applications:

- **Food production:** early detection of bacterial growth increases food safety
- **Soft drink production:** increase safety of bottled beverages
- **Water Distribution Networks:** prevention of water contamination from biofilm
- **Mineral water bottling:** our continuous monitoring solution helps to prevent bacterial spoilage
- **Legionella prevention:** our solution helps to prevent outbreaks of Legionnaires' disease, a form of atypical pneumonia caused by any type of Legionella bacteria
- **Power plant water treatment:** improve heat exchange and power production keeping biofilm growth under control
- **Cooling tower water treatment:** check on biocide effectiveness and elimination of bacteria
- **Cooling towers and bacteria:** what happens when chlorination does not work as expected
- **Once-through cooling systems:** effect of chlorine dioxide on biofilm, shock and continuous dosage
- **Industrial reverse osmosis:** detecting bacterial growth to check and optimize chemical treatments
- **Reverse osmosis desalination:** increase the efficiency of biocide treatment in membrane processes
- **Pulp and paper:** detection of bacterial growth and check on biocide effectiveness in paper mills
- **Biogas upgrading plants:** optimization of biocide treatments to prevent biofilm-related issues in packed beds

EGIDION provides solutions based on 4 types of Biofilm sensors for different applications

A001S3 probe, for highly corrosive environments, moderate heat and chemical resistance

A003S3 probe, resistant to high temperatures and strong chemical treatments, good corrosion resistance

AS01S3, with hygienic connection to the process, flat surface in contact with the liquid and high resistance to chemical treatments, this model is indicated for applications where hygiene is critical.

AX03S3, ATEX certified, this model is indicated for classified areas and applications where there is a risk of explosion (e.g. Oil&Gas).

Our sensors monitor the bio-electrochemical signal produced by bacteria. This signal is directly linked to the biological activity of bacteria, and it is proportional to the surface area covered by biofilm. Therefore, the system monitors just living bacteria, not other kinds of fouling (e.g. mineral deposit, fats, proteins, etc.).

A Biofilm Monitoring System includes one or more sensors, connected to a data acquisition system (PLC, DCS, PC, etc.) through the standard communication protocols like RS485 MODBUS and 4-20 mA.

The suggested number of sensors to be installed strongly depends on the structure and the configuration of a plant and water line: if there are similar conditions in the whole water system, one or few sensors can provide enough information about biofilm development inside the whole plant.

We provide the full 360º 24/7 support

EGIDION provides engineering services like installation, integration and after-sales maintenance and support: with the purchase of our system, our Technical Staff provides a training and support to evaluate the best installation points inside your plant and also support during the initial phase by helping you to interpret the collected data.

We are turning digital innovation into business transformation

At EGIDION and SGS we strongly believe in the huge potential of Internet of Things (IoT) technology and Industry 4.0 to shape the way our customers do their core business: from providing innovative services to higher customer engagement and customer satisfaction, from operational efficiencies to offering completely new business models: we design, implement and operate Smart IoT Solutions with world-class IoT expertise so to help our customers make real-time and fact-based business decisions. Our IoT Platform is designed to support multiple variety of IoT use-cases by incorporating all the industry leading and international standards and management systems in the areas of product safety, energy efficiency, maintenance of critical infrastructure, cybersecurity and profitability of your business by securing the high availability and minimum to none service down-time:

- Cloud based Solution
- Global connectivity
- Device hardware agnostic
- Cybersecurity
- Data collection and advanced analytics (ML, AI)
- Digital Twins capabilities
- Advanced user dashboards and integration capabilities
- Designing and implementing of customer centric innovative solutions
- Existing portfolio of ready to implement solutions
- Solution Validation and Certification
- Rapid ideation, prototyping and certification of MVP

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