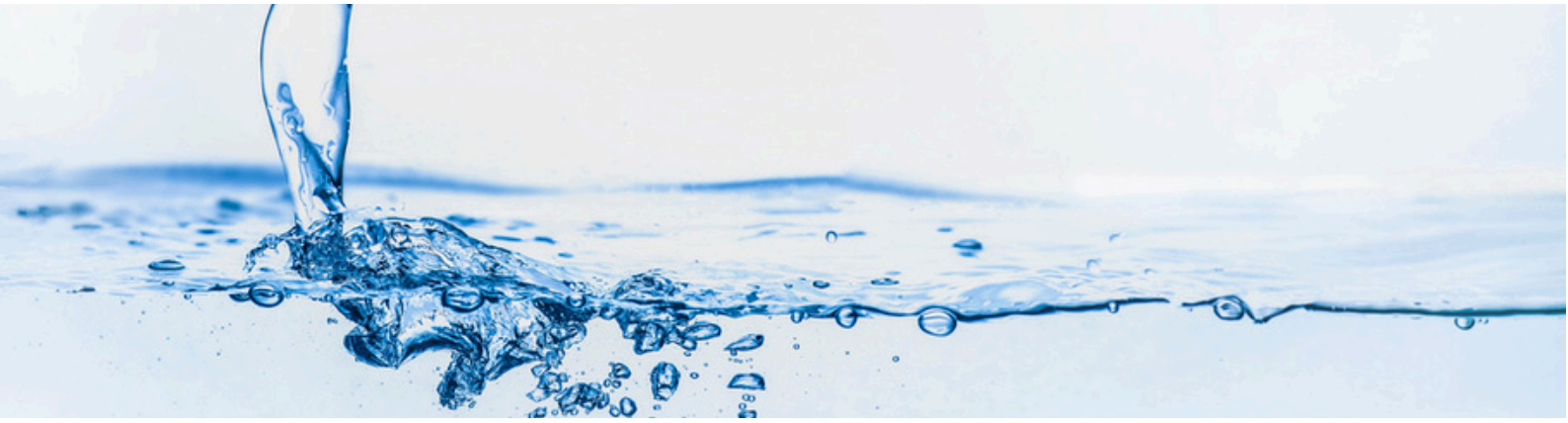
BACTERIAL WATER SCANNER

REAL-TIME. LIVE. CONTINUOUS. AUTOMATED. SIMPLIFIED SYSTEMS FOR BACTERIAL, PARTICLES & BIO/CHEM CONTAMINANTS



Background

VBact develops, manufactures and sells novel, powerful imaging & AI based systems for real-time, live, continuous and automated bacterial and micro-particles total count, size distribution and bacterial population analysis in water and similar liquids.

VBact "Water Scanner" systems [Scanner] replace the standard method of monitoring bacteria and other contaminants. These standard processes are mostly manual, complex and take days to results.

The systems offer superior solutions for critical water quality parameters, management of irregular / contamination events, and validation and optimization of water treatment and CIP processes.

Technology

The systems' state-of-the-art capabilities are achieved by integration of new technological concepts developed by VBact, primarily in the following fields:

- Patented "Direct Imaging" - a special High Definition resolution imaging unit, inducing various properties in each cell/object
- Advanced proprietary image processing algorithms, including AI and Machine Learning
- Digitalization - direct transformation of water into digital data

The Scanner offers **Four** continuous critical parameters for water quality:

1. Bacterial Total Count

2. PhenoMonitor - Population analysis for various contaminants

3. µ-Particle TC µ-Particle

4. Size distribution

Available system models:

1. **In-Line Bacterial Water Scanner** - in-line, automated monitoring of continuous water flow
2. **Lab Bacterial Water Scanner** - testing specific discrete water samples
3. **CIP Scanner** - in-line automated monitoring of last water rinse CIP cycles

New standard of monitoring:

- Detects ALL bacteria, including pathogenic bacteria: *E.coli, Coliform, Legionella, Pseudomonas* etc.
- Real-time results for rapid reaction to irregular events
- Eliminates sampling gaps through continuous 24/7 monitoring
- In-line sampling for the most accurate sampling method
- Autonomous operation: no need for an operator. Automated sampling, testing, reporting, and alerting
- Reagent-free: reduces costs and logistics associated with biohazard materials
- Digitalization & Big Data: collect, understand, benchmark, and drive new actions and insights
- Very low OpEx [~€10/day] and various cost saving: chemicals, energy, time, water, lab resources

Operational efficiencies:

Minimize **Recalls / Boil Alerts** - immediately detects quality changes

- Detect sudden contamination
- React immediately to contamination / out of spec events
- Sensitive water monitoring - by single cell & particle analysis technology

Clear **ROI**

- Minimize product losses: single event = entire ROI
- Validate & optimize water treatment and CIP
- Increase production uptime

Validate **water treatment** processes

- Validate bacterial level reduction along the water system
- Optimize processes and vendors equipment - i.e. filter replacement schedule, filtration
- type, automated chlorination - reduce DBP
- Validate CIP - water, energy, detergents, cleaning time, product quality

Monitor **irregularities**

- Detect contamination level, duration and location - see example at page 3
- Understand micro-particles - clear numerical count and size distribution Monitor
- water sources stability and quality changes along seasons / climate changes

Improve **water data**

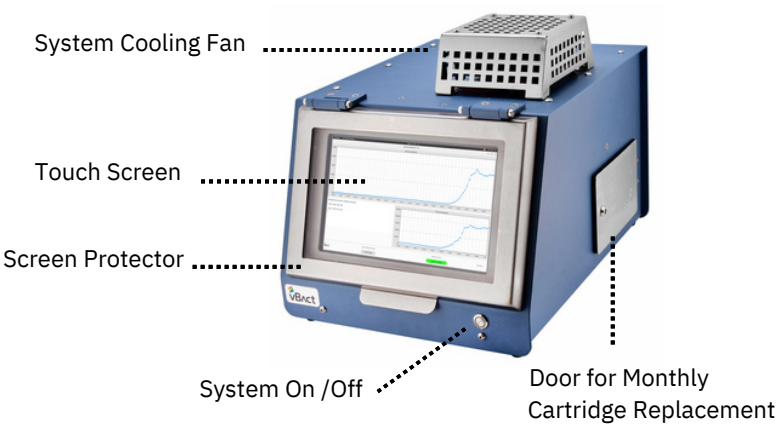
- Scanner provides "Big Data" +1,500 readings /day
- Deliver multi-parameters simultaneously from a single system
- New richer data for improved water analytics and management

Economic **efficiencies**

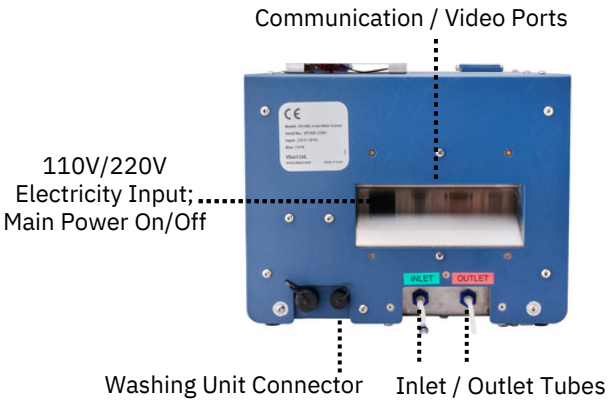
- Low operational cost
- Less conventional testing
- Automation & minimize human errors
- Reduced logistics burden and costs - reagent-free solution

Easy to Use & Own, Small Footprint, In-Field

Front Panel

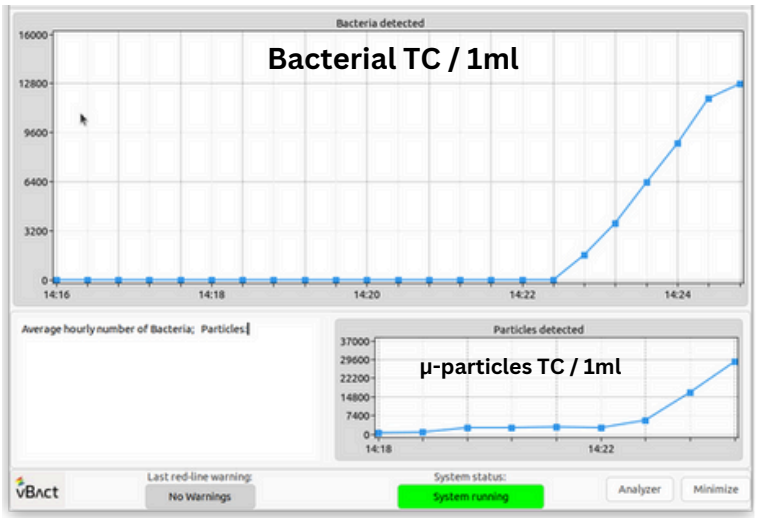


Back Panel

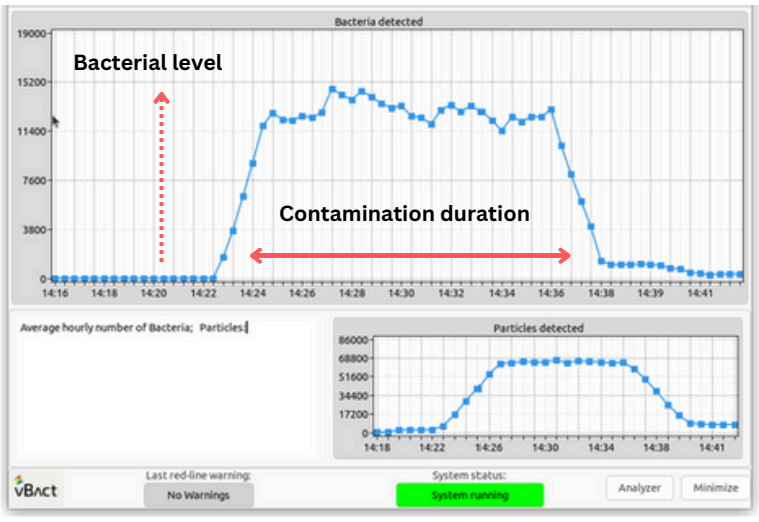


Fully Automated, Continuous Monitoring

The Scanner main screen - clear quantitative results



Contamination starts and immediately detected by the Scanner



Clear data on contamination duration and level

Video - contamination detection demo in real-time:
https://youtu.be/lzdskBPB0i4

PhenoMonitor

Early Warning Holistic Detector for Various Water Contaminations

Introducing **PhenoMonitor**, the first ever cutting-edge bacterial population classifier powered by the innovative VBact Scanner. PhenoMonitor represents a leap forward in water quality monitoring, leveraging advanced imaging technology and AI-driven image processing to deliver unparalleled insights into bacterial populations in real time.

How it Works - holistic view of your water's bacterial makeup:

- Analyzes all detected bacteria in short time live intervals (typically 10 minutes)
- Builds a unique bottom-up analysis of the entire bacterial population
- Presents detailed distribution graphs and tables of unique phenotypic parameters and their sub-units

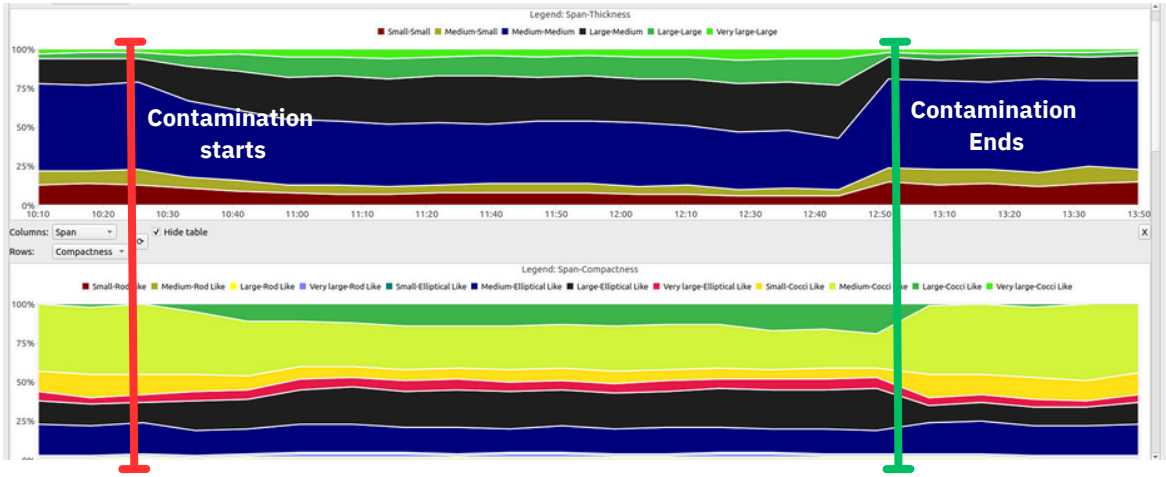
Stay ahead of potential water quality issues:

- Detects changes in water quality stability by identifying shifts in bacterial population composition
- Identifies new bacteria emergence in water sources
- Serves as an early warning for biological & chemical contaminations when bacterial population is altered

Empower your plant with actionable insights:

- Track and analyze contamination events in your water sources
- Learn specific parameter patterns associated with different events
- Develop a library of recognized patterns for future early warning
- Enhance your ability to predict and prevent water quality issues

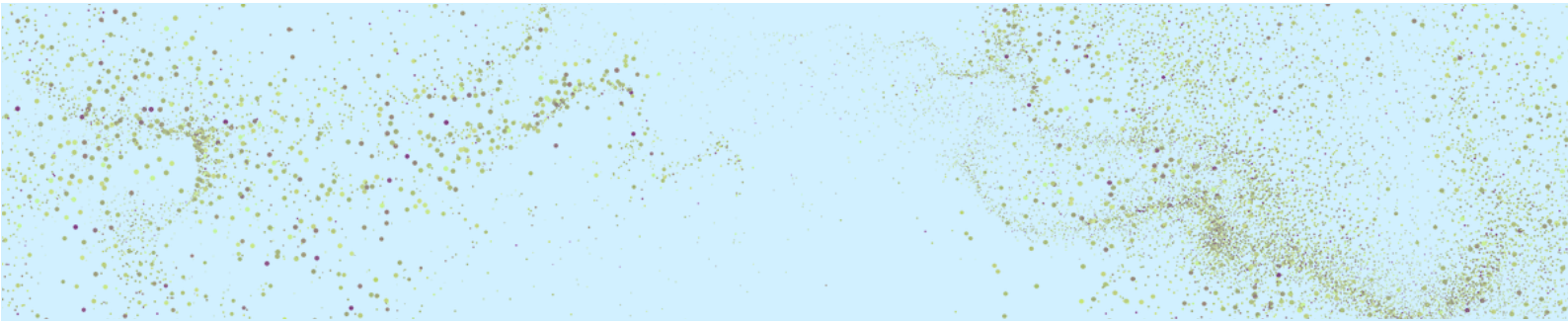
Parameter changes in network water due to *E.coli* emergence



Key Benefits:

1. **Real-time Monitoring**: Live, continuous, automated operation for water quality data and control
2. **Comprehensive Analysis**: Examines all detected bacteria for a true representation of water quality
3. **Predictive**: Identify specific parameter patterns, and develop a powerful early warning tool tailored to your water source
4. **User-friendly Interface**: Easy-to-interpret graphs and tables for quick decision-making
5. **Customizable Alerts**: Set parameters to receive notifications on potential contamination events
6. **Holistic Integrated Approach**: Combines bacterial population analysis with count and particle detection

Micro-Particles Detector



The Scanner Micro-Particles Detector [MPD] is a continuous, automated, real-time micro-particle detection system. It offers superior sensitivity, detailed particle analysis, and real-time monitoring capabilities, making it an invaluable tool for ensuring water quality across various applications. [See micro-particles graphs on page 3]

Advantages over Traditional Turbidity Meters

Scanner-MPD		Turbidity Meter
Detailed particle enumeration and size distribution, allowing for a more precise understanding of water quality	**Detailed Information**	Provides only an overall turbidity measurement in NTU. Does not give specific information about particle size or count.
Provides continuous, real-time data, ensuring no contamination events are missed.	**Real-Time Monitoring**	Typically provide single-point measurements that may miss transient events.
Capable of detecting particles as small as 0.3 microns, providing a more sensitive measure of water quality.	**Enhanced Sensitivity**	May not detect very small particles effectively.

Main applications in the water industry:

- **Drinking Water Distribution:**
  - Monitor water quality in real-time
  - Detect and respond to contamination events
  - Identify and locate pipe breaks or leaks
- **Industrial Processes:**
  - Monitor water quality in industrial processes
  - Control the reduction of particles along the treatment process
  - Prevent equipment damage from particle-related issues
- **Wastewater Treatment:**
  - Monitor the efficiency of treatment processes
  - Track the removal of suspended solids
  - Comply with discharge regulations
- **Environmental Monitoring:**
  - Assess water quality in rivers and lakes
  - Track pollution sources
  - Support ecological studies
- **Water Treatment Plants:**
  - Monitor the efficiency of treatment processes
  - Detect and respond to changes in water quality
  - Control filtration systems

Bacterial Water Scanner - Main Specifications	
System dimensions / weight	45 x 33 x 33 cm / 12Kg
Sampling method	In-line, continuous flow
Analysis time	Real-time
Cell / µ-particle Size	0.3 µm and above
Water pipe connectors - inlet / outlet	4mm / 6mm, simple bypass connection
Power input	110V / 220V AC
Data output communication	LAN, Wi-Fi, Modem Cellular
Inlet liquid temperature	10 - 60 C°
Bacterial & µ-particles Limit of Detection	1 to 5x10^6 / 1 ml
Water turbidity	NTU < 5
Disposable [periodical]	Scanner Cartridge - flow-cell and pre-filter unit. Periodical replacement - up to one month
Operational ambient temperature / humidity	10 - 35 C° / 0-80%
Certification	CE, RohS

Ensuring Water Quality & Safety - Anytime, Anywhere

www.VBact.com

info@vbact.com