

# The LuminUltra Solution

## Rapid Microbial Monitoring

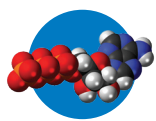
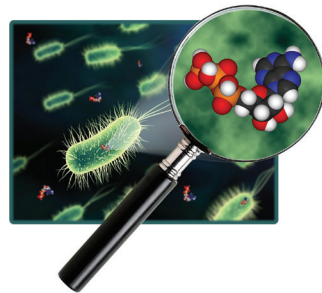
Regardless of the situation, LuminUltra's advanced 2nd Generation ATP technology provides fast, complete, and accurate insight into microbiological activity. Both portable and easy to use, our test kits provide an interference-free indication of total microbial quantity within minutes of sample collection allowing you to save valuable time, help you better manage risk and reduce operating costs.

### What is ATP?

ATP or Adenosine Triphosphate, is the main energy carrying molecule for all forms of life. This makes the measurement of ATP a direct indication of total microorganisms!

### How is it Measured?

If you have seen a firefly at night, then you have seen the ATP measurement process in action. Simply put, ATP recovered from microorganisms is mixed with the enzyme Luciferase to produce light which is measured in a luminometer. More microorganisms = more ATP = more light!



ATP + Luciferase Enzyme = Light

Luminase™

THE REACTION

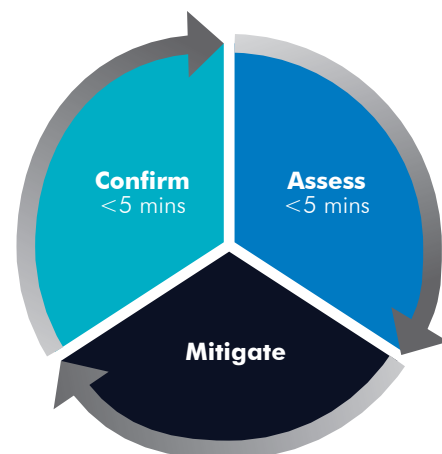
### What can ATP testing do for me?

The measurement of ATP detects all living microorganisms, rather than just a fraction of the total population. As well, ATP testing is extremely fast - it provides results in minutes instead of days. These two critical advantages over traditional counting techniques can help you save time, manage risk, and reduce cost!

### The LuminUltra Difference:

What makes LuminUltra's 2nd Generation products different from traditional plate counts and other ATP test kit suppliers? LuminUltra's technology is...

- ◆ **Rapid:** Provides results in minutes rather than hours, days or weeks.
- ◆ **Accurate:** LuminUltra's 2nd Generation ATP test kits are designed specifically for water, organic, and wastewater samples.
- ◆ **Complete:** Achieves total recovery of all microorganisms in the sample rather than a small fraction.
- ◆ **Quantitative:** Includes a built-in standard to normalise results for valid historical and site-to-site comparisons.
- ◆ **Reliable:** LuminUltra's products meet the highest of quality standards and our expert staff provides unparalleled support for all applications.



STRATEGY FOR USE

# Portable & Complete Microbial Detection

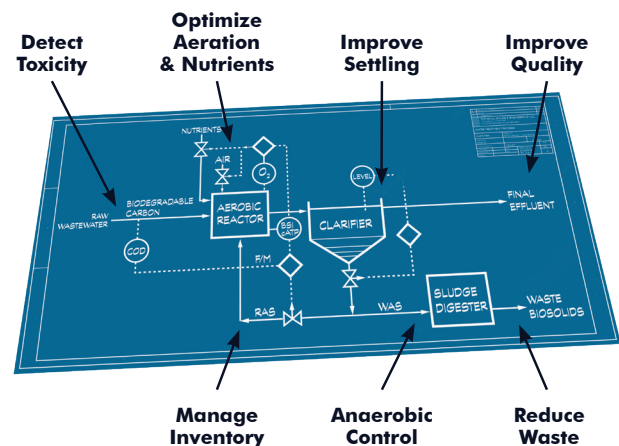
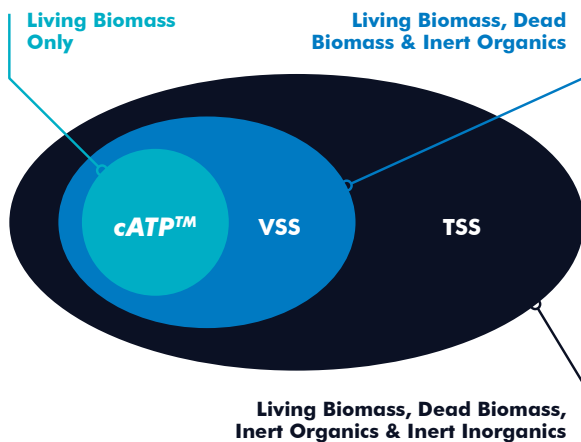
For use in multiple markets – including drinking water, wastewater, industrial manufacturing and oil & gas – LuminUltra’s 2nd Generation ATP-based operator-friendly solutions enable you to take the microbiology laboratory into the field to achieve same-shift problem solving.



## WASTEWATER

It’s the most fundamental aspect of biological wastewater treatment. Are you monitoring the Biomass?

LuminUltra’s biological monitoring solution provides direct insight into the health of your biomass, allowing you to observe how it responds to environmental and process changes. The ability to differentiate between, and quantify, both living and dead cells within 5 minutes, allows cause-and-effect relationships to be established with all key process parameters giving you better control.



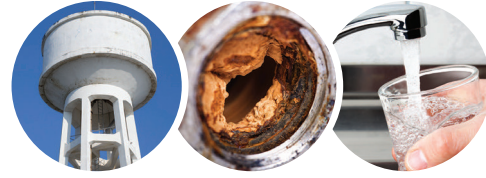
- Our tool will help you realize a new level of process stability and efficiency... in 5 minutes!
- ◆ Optimize F/M, Dissolved Oxygen, and other key process variables
  - ◆ Eliminate excess solids and minimize sludge handling costs
  - ◆ Detect sludge bulking well in advance of conventional parameters (i.e. SVI)
  - ◆ Diagnose deflocculation and other settling issues
  - ◆ Detect toxic influent and its impact on your bioreactor

- ◆ Assess damage done by upsets and speed up the recovery process
  - ◆ Pace dosing of nutrient blends and biostimulants
  - ◆ Assess treatability of challenging substrates through bench scale jar tests
- Wastewater treatment is typically very expensive and seen as a pure cost; the less that is understood about the process, the more expensive it becomes. LuminUltra’s QuenchGone21™ Wastewater test kit closes that gap, giving you the information you need to troubleshoot and optimize the process, saving you both time and money.



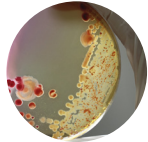
### INDUSTRIAL WATER

Quantify microbial content in any industrial process water application.



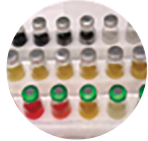
### DRINKING WATER

Are you in control of microorganisms in your drinking water system?



#### CULTURE TEST

> Days to weeks for Results in Lab by specialised staff



#### SERIAL DILUTION

> Days to weeks for Results in Lab by specialised staff



#### 2<sup>ND</sup> GEN ATP

> < 5 minutes for Results at site, no specialised training required

#### 2nd Generation ATP® - Your 1st Line of Defense

2nd Generation ATP monitoring offers a powerful combination of speed, versatility, portability, and accuracy for microbiological testing in any industry concerned with water. All living cells contain ATP regardless of whether they are bacteria, fungi, or any other type of microbe. As such, its measurement is a direct indication of the microbiological content in your sample. All-inclusive results in minutes provide enhanced monitoring capabilities for superior control of microorganisms in your process.

## Side-by-Side Comparison

Method	2nd Generation ATP	Culture Tests	Microscopic Examination	Molecular Biology Methods	Particulate Analysis	Respirometry
What is detected?	Total Microorganisms	Culturable Microorganisms	Total or Specific Microorganisms	Specific Microorganisms	Suspended Solids	Metabolic Activity
Interferences in detecting total living biomass	None	UNABLE TO MEASURE	Dead biomass; non-biological particles	UNABLE TO MEASURE	Dead biomass; non-biological particles	Respiration Type
How long to get results?	Minutes	Days to Weeks	Minutes to Hours	Minutes to Days	Minutes to Hours	Minutes to Hours
Can give results onsite?	Yes	No	Yes (but difficult)	Yes (in some cases)	Yes	Yes
What types of samples can be tested?	Fluids & Solids	Fluids, Re-suspended Solids	Fluids & Solids	Fluids, Re-suspended Solids	Fluids only	Fluids only
How much skill is required?	Low	Moderate	High	Moderate to High	Low	Moderate
What is the capital cost?	Low	Low	High	Moderate to High	Low	Moderate to High
What is the cost per test?	Moderate	Moderate	Low	Moderate to High	Low to Moderate	Low
What is its best use?	Total microbiological concentration	Specific microbiological concentration	Population diversity	Population diversity & specific concentration	Total particles	Specific metabolic activity

# GeneCount™ In-Field qPCR solution

DNA-based analyser for measuring legionella and sulfur reducing bacteria

Microorganisms cost the oil & gas, water, and manufacturing industries billions of dollars in damage annually by corroding metal, degrading product, and inhibiting processes.

Quantitative Polymerase Chain Reaction (qPCR) is a highly sensitive DNA-based analysis that can be used to detect and quantify those microbes or groups of microbes that are known to be significant in your process. Results of this analysis can help you to quickly understand if you are at risk so you can take action faster, while making better decisions.

Now imagine having access to this kind of DNA data while in the field. LuminUltra's GeneCount™ in-field qPCR solution gives you the tools you need to run DNA analysis on your samples, review the results, and make immediate targeted treatment decisions based on that feedback, all in approximately 2 hours and while onsite. Because there is no need to get samples back to a lab for testing, samples don't need to be preserved. This is a huge benefit for remote or offshore locations – where shipping samples is costly and not always readily available.

## Why use LuminUltra's solution?

### Here's the GeneCount advantage:

- ◆ Uses state-of-the-art assays that target microbial DNA ensuring high specificity and maximum coverage of damaging or beneficial organisms
- ◆ DNA purification kits are optimized for target applications, designed to remove interferences, and enable you to extract DNA on-site
- ◆ Can run multiple samples at a time - up to 14 simultaneously plus controls depending on the device
- ◆ Rapid results in approximately 2 hours
- ◆ Optimized qPCR workflow designed for immediate use out of the box
- ◆ Training and ongoing support from DNA and Applications experts
- ◆ qPCR complements 2nd Generation ATP testing by allowing for specific, target microbe quantification after rapid, total biomass quantification.



## Getting started

### Everything you'll need, and available from LuminUltra:

- ◆ LuminUltra's GeneCount™ Q-8 and Q-16 real-time quantitative PCR devices deliver high performance in a compact and portable package. Q-8 and Q-16 (8 and 16 wells, respectively)
- ◆ DNA purification kits
- ◆ Targeted qPCR reagent/assay panels. Ask us for a complete list of pre-developed assays.

Implementing qPCR testing into your routine microbiological testing plans can help prevent costly problems caused by microorganisms. Now it's available for in-field applications.

## The process is simple. The results are actionable.

### Implement qPCR testing today.

