



**Automated, On-line, Rapid Monitoring of
Bacterial Load in Water Sources**

EZ-ATP[®]

On-line Microbiology Analyzer

Determination of Bacterial and Pathogen Load Through Adenosine Triphosphate (ATP)

Applications

- Drinking water production / distribution
- Cooling tower water treatment
- Bottling of beverages
- Homeland security
- Waste water treatment plants



Masters in Analytical Technology.

AppliTek

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Why ATP?

Adenosine triphosphate, or ATP, is considered as the energy currency of life. It is a high energy molecule found in and around living cells and used for a myriad of biological functions. In fact, it is an element so essential to life that it can be considered as being part of the "design specifications" of any living cell or organism. Hence, using ATP as a parameter for assessing microbial load and presence of pathogens has led to the development of fast and sensitive ATP test kits which have become standard practice in many industries and application fields.

Technology basics

The perceived need for more rapid and reliable methods for measuring water quality, especially in the area of drinking water safety, has established new interest in the use of the ATP chemiluminescence. In a process environment, or for any process where the microbiological water quality is critical, corrective actions depend on timely data. Traditional plate counting methods take days for results to become available and this may be further increased by laboratory reporting times.

The **EZ-ATP®** On-line Microbiology Analyzer is not simply a test kit but a unique alternative to current analysis procedures, taking the standard ASTM test method a step further. The luciferin-luciferase reaction is implemented in an on-line, automatic analyzer mainframe. Sampling, analysis and reporting are automatic, which allows fast feedback on the microbial load in the water body.

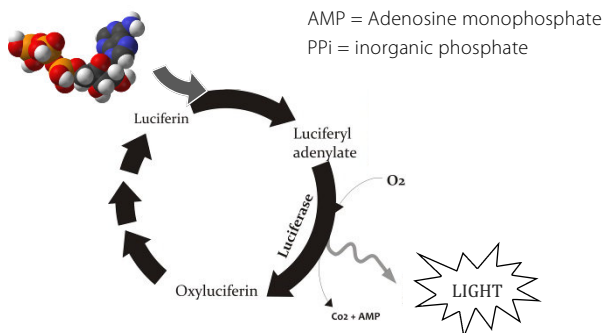
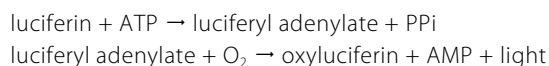
Parameters

The **EZ-ATP®** is capable of measuring the total ATP portions of any type of bacterial microorganism present in the water sample, such as fecal coliforms (*E. coli*), sulphate reducing bacteria, nitrifying bacteria, Legionella... A high ATP value indicates a potential risk in surpassing a threshold value of microorganisms in the past or in the near future. The **EZ-ATP®** allows to differentiate between **intracellular and extracellular ATP levels**. This is important if one wants to conduct a true assessment of microbial activity and health:

- **Extracellular ATP** also called free ATP, or the portion of ATP released by dead cells
- **Total ATP**, obtained after a proprietary, non-chemical lysis of the incoming sample
- **Intracellular ATP**, obtained by calculation (total ATP minus extracellular), or the portion of ATP from the metabolically active living microorganisms

Analysis principle

The basic analysis principle of the **EZ-ATP®** On-line Microbiology Analyzer is similar with ATP test kits in a way that the ATP is quantified by means of a chemiluminescence reaction found in fireflies. Luciferin is used as a substrate in a 2-step chemical reaction with ATP, catalyzed by the firefly luciferase enzyme. The exothermic reaction releases energy to produce visible light. This light output is proportional to the amount of ATP used in the reaction, thus indicating the ATP level in the sample:



An additional challenge in the design of a reliable and accurate microbial monitoring system is the ATP recovery rate. Intracellular and complexed extracellular ATP are impossible to detect without proper sample treatment. In addition to a first analysis, the **EZ-ATP®** sequences a second cycle with a non-chemical lysis of the sample, in order to determine the total ATP. This procedure guarantees full recovery of the ATP portion and allows to take the right corrective actions based on the right data.

EZ-ATP®: overview of features

- Complying with internationally accredited ASTM D4012–81 standard test method
- Rapid measurement: 10 minutes (including lysis)
- Complete ATP recovery: detection of intracellular, extracellular and total ATP
- Low cost of analysis relative to a large number of results
- Smart functions: automatic calibration and cleaning
- No bias from the composition of the growth medium such as the case with plate counting
- Measuring ranges: 0 – 250 ng/L (0 – 500 pM ATP) for drinking water, or higher