PROTECTION THROUGH DETECTION™

PRODUCTS & SERVICES BROCHURE

Bacterial Endotoxin Testing Reagents, Readers & Accessories
Including **PyroSmart** NextGen® Recombinant Cascade Reagent (rCR)

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First-Gen. **Second-Gen. NEXT-GEN.**

Wherever you are on your BET journey, we've got you covered.

It's Official!

The US Pharmacopeia (USP) Chapter <86>, "Bacterial Endotoxins Test Using Recombinant Reagents," will allow the use of non-animal-derived reagents for endotoxin testing — which includes **PyroSmart NextGen®**.

See page 15 for more info!

BETransformed. ACC transformed endotoxin testing in 1974 with the introduction of its Pyrotell® lysate gel-clot reagent and then again with its chromogenic and turbidimetric tests, Pyrochrome® and Pyrotell®-T.

Now, we are transforming the industry again with **PyroSmart NextGen®**, a groundbreaking recombinant BET solution with all of the quality and consistency you have come to expect from our traditional LAL reagents.

As you navigate your own transformation journey — from qualitative to quantitative to recombinant — count on ACC for the highest-quality products and support.

Your Goals. Your Endotoxin Experts.

A Partnership In Change

Where do you start? Bacterial endotoxin testing is an essential tool for quality control of raw materials, in-process sample screening, and in-process water system maintenance. It's also test required by regulatory bodies to release your finished products.

Whether you're bringing testing in house, looking to switch from gel-clot to kinetic, validating a sustainable recombinant reagent, or converting to ACC as your supplier, you can count on ACC every step of the way. With 50 years of experience in the BET industry, we have your answers.

ACC Is With You at Every Step

Our experts will learn about your company and tailor a process to help you meet your goals.

1 | QUALIFY ACC AS SUPPLIER

Ensure compliance with strict quality and safety standards, reducing the risk of product recalls, regulatory penalties, and supply chain disruptions.

2 | METHOD DEVELOPMENT OF SAMPLES

Optimize test sensitivity, reduce interference from complex drug formulations, and validate the most effective BET detection approach.

3 | VALIDATE SYSTEMS/ EQUIPMENT

Minimize the risk of false positives or negatives, enhances data integrity, and ensure consistent performance over time.

4 | VALIDATE SAMPLES

Ensures accurate and reliable results by confirming that the test method is suitable for the specific drug formulation.

5 | WRITE PROCEDURES

Well-documented procedures help minimize errors, improve reproducibility, and ensure that all personnel follow the same validated methods.

6 | TRAIN STAFF

Well-trained personnel minimize errors, enhance test consistency, and maintain data integrity.

7 | IMPLEMENT NEW PROCESSES IN QMS

Continuous improvement through QMS updates strengthens quality control, enhances staff accountability, and supports reliable, reproducible test results, ultimately ensuring product safety and regulatory readiness.

8 | YOUR GOAL!

SUCCESSFUL VALIDATED CHANGE

Attainable Sustainability

ACC's Horseshoe Crab Sustainability Project

ACC's one-of-a-kind sustainability project meets a milestone of over one million juvenile crabs released!

In 2018 after working with local regulators to receive a class 1 type 4 aquaculture permit, ACC introduced our Horseshoe Crab Sustainability Project. This unique program was aimed at complementing our 50-year history of horseshoe crab conservation and ensuring a stable supply of horseshoe crabs now, and for future generations. The program was so successful that, in 2019, we were able to secure grants to help organizations release horseshoe crabs in Asia. In 2021, we achieved a major milestone and released our 1,000,000th crab in the waters of Massachusetts. In 2022, we made another milestone when we were issued a US patent on the system! (US Patent #11425894). To date, over 1.3 million juveniles have been released in Massachusetts!!

Our team collects horseshoe crab eggs, facilitates fertilization through IVF, nurtures hatchlings as they mature into juveniles, and strategically releases them back into their natural environment. This program only uses eggs collected from bait crabs that are sacrificed for the eel, conch, and whelk fisheries, extending their genetic legacy for generations to come.

Please visit acciusa.com for more information and future updates!

Horseshoe Crabs & the Biomedical Industry — Know the Truth

What makes a horseshoe crab's blood so special?
Horseshoe crab blood carries factors that react to antigens found on and in gram-negative bacteria walls by forming a clot. The clot isolates the bacteria and protects the crab from infection. The blood also begins a healing process similar to human healing: a wound forms a clot, a scab, and eventually heals.

What makes limulus amebocyte lysate, or LAL, so important?
The LAL test is the most sensitive, accurate, and cost-effective test on the market today to detect contaminating endotoxins. It was first approved by the FDA in the 1970s and is now considered the gold standard because it can, in a relatively simple test, detect endotoxin in the parts per billion. Prior to LAL, hundreds of thousands of rabbits were used to test for endotoxins. Animals were injected with samples of the product being manufactured and monitored to see if they developed a fever which may indicate the presence of gram-negative bacteria. LAL-based assays are more humane, more accurate, and more cost-effective than rabbit-based tests. Plus, they can give results in a test tube, in about an hour. There are very few people you are likely to meet in your lifetime who have not benefited from a bacterial endotoxin test.

What types of things are tested with the blood?
If endotoxin enters your bloodstream, it can make you sick and possibly even kill you. For this reason, the US FDA has mandated that all injectable or indwelling materials must be tested for endotoxin contamination before being released for sale. This is to protect the public from products that are not sufficiently free of materials that can make a patient ill from exposure to gram-negative cell wall material. The test ACC manufactures is used for medical devices, such as knee replacements, stents, heart valves, and intravenous solutions; it's also used for drugs, vaccines, insulin, and chemotherapy drugs. In essence, anything injected or implanted into the human body must be free of endotoxin.

LAL is also used to make a diagnostic assay, Fungitell®, that can detect the presence of invasive fungal infections. This is a fast and accurate assay used in hospitals for critically ill patients and in patients who are at risk. In 2024 alone, over 800,000 people were tested using this assay.

I have read somewhere that crab blood is worth $15,000 a quart. Is this true?
Absolutely not — this is a myth sensationalized by some media. Manufacturing LAL, which is made from the white blood cells of horseshoe crabs, is a complex process that is regulated by the FDA and must be done under extremely clean conditions. A typical LAL test costs less than $20. In terms of the impact it has had on human health and safety, it is safe to say it has saved many lives and is therefore priceless.

Where do the crabs you bleed come from?
Most of the crabs that come to our facility are from Massachusetts waters, Vineyard Sound, Nantucket Sound, and Buzzards Bay. Fishers catch them using different techniques, but they must follow strict regulations on size, number of crabs harvested, and abide by strict quotas.

How does the process of bleeding crabs work?
Every crab that enters our facility is checked for health, has it's sex determined then the vendor and origin recorded. This is all reported to regulators monthly . The process itself is very similar to when people donate blood. The crabs are placed in a very clean laboratory, where we disinfect a portion of the shell and carefully insert a sterile needle. The crabs have a sinus in the dorsal aspect of their body just under the shell that holds excess blood; we collect from that region. The crabs are held in a very specific manner, limiting the blood that can be harvested from the dorsal sinus. The majority of the blood, which remains in the gill area, is untouched. The process takes only a few minutes and the crabs are held in darkened areas and kept moist

before being returned to the supplier. Studies have shown that the crabs tolerate this process very well, and the overwhelming majority of animals survive.

What threats face the horseshoe crabs today, are they endangered?
Crabs in the United States are regulated and monitored carefully. They are not endangered and, in many areas, have growing populations. In other parts of the world, they are victims of pollution and humankind's development of coastal areas and are not so closely monitored.

Like any sea creature, horseshoe crabs are dependent on a suitable environment in which to live and reproduce. Water quality is an important factor, as is having suitable beaches in which to lay their eggs. Fertilizers, septic systems, and other forms of pollution can greatly reduce the quality of water on which the crabs depend. Sea walls, rip-rap, and jetties can manipulate the natural movement of sand on beaches and affect spawning habitat. Beach nourishment, the practice of bringing in truckloads of sand to beaches to replenish what's lost or make them look nice, can bury millions of eggs before they hatch. Crabs are also used as bait for conch and eels, which is another source of man-made mortality. Fortunately fisheries managers use the best science available to monitor the population and utilize structured decision making to determine quotas etc. It is safe to say there are tens if not hundreds of millions of crabs in the US.

What does ACC do to support conservation?
ACC has always promoted and practiced a catch-and-release fishery where the overwhelming majority of crabs survive the process of blood extraction. We work closely with fishermen and regulators to minimize the impact we may have on crab populations. ACC was instrumental in creating a minimum size limit for crabs to ensure only mature crabs are collected, and in helping to keep a biomedical-only fishery in Pleasant Bay, Massachusetts, where all the crabs collected are released. We have supported conservation efforts that include the use of bait bags, decreased catch limits, and prohibition of fishing for crabs around peak spawning periods. We also participate in the Massachusetts "rent-a-crab program," where crabs destined for use as bait are brought to our facility first. Unique to Massachusetts, this program helps to limit the overall impact on crabs. ACC takes part in the Atlantic States Marine Fisheries Commission (ASMFC) Horseshoe Crab Advisory Panel, where we helped develop the Best Management Practices (BMPs) for the industry. We also collect data for the regulators from every crab that enters our facility, which is invaluable to understanding population dynamics. Most recently, ACC has implemented a one-of-a-kind sustainability project where we can hatch and grow juvenile crabs in the lab and then release them to the wild. You can learn more about this exciting new program on the ACC website.

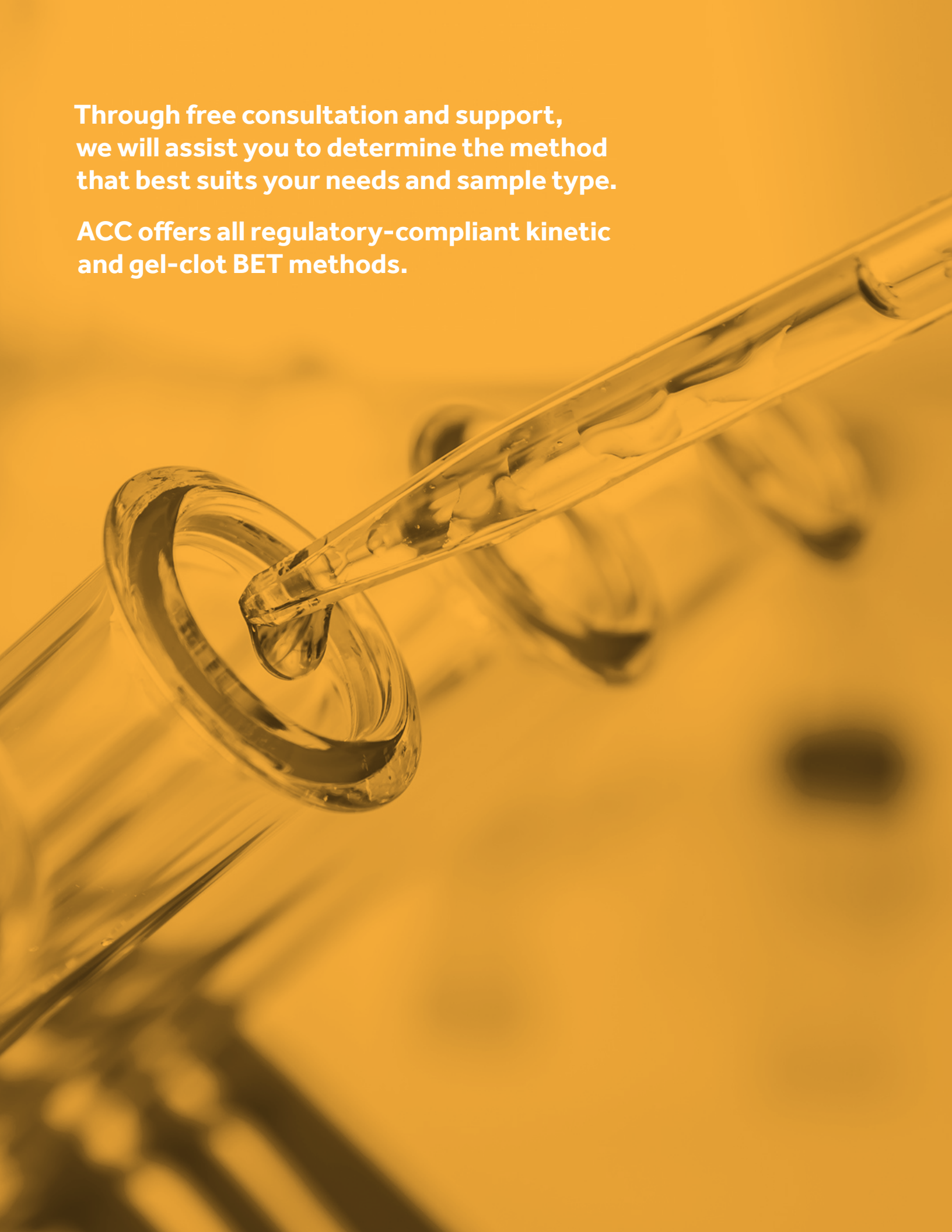
What information should more people know about horseshoe crabs?
Horseshoe crabs and their ancestors have lived on Earth for approximately 400 million years and have survived several mass extinctions. They are not harmful and do not sting or bite.

When you see a horseshoe crab shell washed up on the beach, it is likely a molt, and not a dead crab. Crabs can only grow by shedding their shells and growing larger ones. Old shells are discarded, and many beachcombers worry crabs are dying when they are really just growing up. Even as recent as the 1950s, crabs were destroyed by the tens of thousands by people on Cape Cod and elsewhere fearing they were harmful to shellfish beds or for use as fertilizer and pig food. In fact, they are useful for shell fishermen by helping to till and keep sediment aerated. They are an important part of the international ecosystem.

What can I do?
Water quality and human development are major threats to all fragile ecosystems such as the embayments where horseshoe crabs reproduce and grow. Do your part in limiting the impact humans have on water quality and beach erosion. If you ever see a crab upside down on the beach, gently roll it over so it can return to the water. And remember, the next time you or a loved one receives an injection, IV, or implant, be sure to thank a horseshoe crab!

Through free consultation and support, we will assist you to determine the method that best suits your needs and sample type.

ACC offers all regulatory-compliant kinetic and gel-clot BET methods.



BET METHODOLOGY & SUPPORT SERVICES

BET Method Options

Methodology & Applications

Through free consultation and support, we will assist you to determine the method that best suits your needs and sample type. ACC offers all regulatory-compliant kinetic and gel-clot BET methods.

Introduction

Limulus Amebocyte Lysate (LAL) tests detect and quantify bacterial endotoxins derived from the outer cell wall membrane of gram-negative bacteria. The critical component of the LAL reagents used in endotoxin tests is derived from blood cells (amebocytes) of the horseshoe crab, *Limulus polyphemus*. Amebocytes contain the proteins of the blood-clotting mechanism, which is triggered primarily by endotoxins and also by (1→3)-β-D-glucan. LAL reagents are primarily used to test for endotoxins in injectable pharmaceuticals, biological products, medical devices, and renal dialysis centers. Endotoxin tests are described in the Bacterial Endotoxins Test chapter in the US Pharmacopeia (Chapter <85>) and in the equivalent chapters in the European Pharmacopoeia (Chapter 2.6.14) and the Japanese Pharmacopoeia (General Tests, No. 4.01). Modified LAL reagents can be used for specific detection of (1→3)-β-D-glucan.

Selecting a Method

Consider the following when deciding which bacterial endotoxin test method to use:

- What are the regulatory requirements, if any?
- What type of product or sample is to be tested?
- What test sensitivity is required? (What is the endotoxin limit specification for the sample?)
- Is quantitative analysis desired?

There are three principal bacterial endotoxin test methods: the chromogenic, turbidimetric, and gel-clot methods. The first two may be grouped together as kinetic photometric methods, as they require a timed optical reader.

Both chromogenic and turbidimetric methods offer the greatest sensitivity, allowing detection of low endotoxin concentrations and greater dilution of samples, which is important for overcoming interference. Both kinetic methods utilize software to quantify your test results. The gel-clot method is a simple, positive/negative, low start-up cost alternative that has been the reference method for years.

Kinetic Testing Methods

Chromogenic Method

The BET reagent is formulated with a synthetic substrate which produces a chromophore when cleaved by endotoxin-activated enzymes.

- Requires either the Pyros Kinetix® Flex tube reader or an incubating plate reader system, such as the BioTek ELx808 IUTM*
- Maximum sensitivity to 0.001 EU/mL, the highest chromogenic sensitivity available in the BET industry when using ACC's Pyrochrome® reagent
- Electronically stored data
- Incubation time varies depending on the standard curve range
- High sensitivity allows for greater dilution to overcome interference

Turbidimetric Method

The optical density (turbidity) increase that accompanies the clotting reaction is read in our Pyros Kinetix® Flex tube reader or in an incubating microplate reader.

- Requires either the Pyros Kinetix® Flex tube reader system or an incubating microplate reader such as the BioTek ELx808 IUTM*
- Maximum sensitivity to 0.001 EU/mL, the highest sensitivity available in the BET industry when using ACC's Pyrotell®-T reagent
- Quantitative test results and electronically stored data
- Incubation time varies depending on the standard curve range; results can be obtained in as little as 15 minutes with ACC reagents
- High sensitivity allows for greater dilution to overcome interference

Gel-Clot BET Testing Method

Gel-Clot Method

The formation of a gel clot indicates the presence of endotoxin in a sample. The method is performed in small test tubes and is read manually by inverting the test tubes.

- Requires non-circulating water bath or dry bath incubator
- Manually read test
- Reagents of differing sensitivity are available: 0.25, 0.125, 0.06 and 0.03 EU/mL
- May be less sensitive to interference than other methods
- Is the referee method as per BET chapters in the US, European and Japanese Pharmacopeia

Overview of Testing Procedures

The following section summarizes the procedures/steps to be taken to perform routine product release testing of a sample in a regulated environment. In an unregulated environment, or when testing for informational purposes only, follow the procedures described under Preliminary Testing.

Qualification of Reagent, Technician & Laboratory

The reagent must be tested to ensure that it is performing to specification. Technicians must be qualified to perform the test and the absence of significant day-to-day or inter-technician variability in the laboratory should be documented. This requires testing using endotoxin standards only, not samples.

Preliminary Testing

Preliminary Testing is not a regulatory requirement but is an important step to develop a set of conditions for the test method that can be used in the Test for Interfering Factors to demonstrate the absence of interference. During Preliminary Testing, samples should be characterized for endotoxin contamination and/or potential interference. It is typically performed by testing a series of dilutions of sample with and without a Positive Product Control (PPC). PPCs consist of sample with a known amount of endotoxin standard. The purpose is to indicate that added endotoxin is appropriately detected and that the sample does not interfere with the detection of endotoxin.

From the results of the Preliminary Testing, a product dilution and possibly product treatment is selected for the Test for Interfering Factors (see below). The endotoxin limit for the product must be detectable at the dilution selected.

Test for Interfering Factors (Validation)

The Test for Interfering Factors is performed to validate the test conditions and dilution for the particular sample type. It is accomplished by demonstrating that endotoxin added to the sample in PPCs can be readily detected within required limits.

Routine Testing

Routine testing is conducted using the sample method preparation and conditions for the Test for Interfering Factors and includes a parallel PPC to check for interference. Tests also include negative controls and appropriate standards. Multiple number of units per lot of finished product should be tested, usually sampled from the beginning, the middle, and the end of the production run. For medical devices, aqueous extracts of up to 10 units are tested, usually after pooling.

Support Services

ACC offers its customers extensive technical support. Our Global Technical Service department is staffed with experienced professionals who provide customer assistance for the full range of ACC products and services.

Technical support is available by telephone, email, and in person, through workshops, on-site training, or on-site consultation. Customers who have questions about individual products, test methods, instrumentation, and/or software are invited to call our staff.

SOFTWARE VALIDATION PROTOCOLS

ACC offers Validation Protocols that provide the end user with a comprehensive set of integrated documents to guide them through the system validation process. The protocol files allow users to edit the documents to meet their company's specific validation requirements.

REAGENT TRANSFER PROTOCOL

The Reagent Transfer Protocol document (RTP) is used to validate the change from another manufacturer to ACC BET reagents. If changing BET reagent manufacturers, ACC offers assistance with guidance and instructions for using the Validation Protocol. This can be used as verification of the validation process. The Reagent Transfer Protocol is designed to assist users in completing validation of their switch from the current BET reagent to an ACC product. During this process, if you require any assistance, you will be able to obtain help and advice through the Technical Services department of ACC.

EXPERTISE & RESOURCES

Assistance with selecting a test method or reagent sensitivity is always available from our Technical Service Department and representatives in the field. Our staff can help with Preliminary Testing, Testing for Interfering Factors or Routine Testing. The LAL Update®, our newsletter, includes useful technical articles and is available on our website. Our Contract Test Services (see page 38) team regularly performs Preliminary Testing and method development and can provide results using all test methods. Regardless of which method is selected, you can always be assured of the full support of ACC.

For details on endotoxin testing in the United States, users should consult the current revision of the US Pharmacopeia (USP), chapter <85>, "Bacterial Endotoxins Test," and chapter <86>, "Bacterial Endotoxins Test Using Recombinant Reagents." For those testing outside the US, you should consult your local regulatory requirements for the BET.

ON-SITE CONSULTING SERVICES

ACC staff is available to visit client sites to assist investigations and troubleshooting. These visits often address Bacterial Endotoxin Testing (BET) procedures, in addition to identifying sources of contamination in test laboratories and manufacturing processes.

#CSOS01	On-site Consulting Services (per day)
#SCOS01	On-site Service Call (per day)

CUSTOMIZED ON-SITE WORKSHOPS

ACC can customize a workshop for you and your staff and conduct it at your facility or ours. Instructors work with you to create a training program tailored to your specific requirements.

#WKSP01	One-Day BET Workshop (per workshop, up to 5 attendees)
#WKSP02	Two-Day BET Workshop (per workshop, up to 5 attendees)
#WKSP03	Three-Day BET Workshop (per workshop, up to 5 attendees)
OSCP-01	One-Day On-site Compounding Pharmacy Training

METHODOLOGY BACKGROUND

This course is designed to introduce BET methodologies to technicians and managers who are new to endotoxin testing. Topics include:

- Endotoxins—What they are, where they come from, and why they are important
- BET—An overview of the BET/endotoxin reaction, with emphasis on sources of interference
- Detailed instruction of the test methods, including a discussion of laboratory setup, materials, and aseptic techniques
- Sample handling and preparation
- Practical approaches to sample characterization and overcoming interference
- Technician and laboratory certification and validation of the BET

HANDS-ON LABORATORY

The laboratory courses for kinetic and gel-clot methods are designed to give the attendee hands-on experience conducting endotoxin tests. Participants perform tests and learn to read and interpret results. Familiarity with general laboratory techniques (especially pipetting) is essential.

IN-DEPTH TOPICS

This course provides the experienced technician with a more detailed understanding of how a BET program can be applied to quality control. Topics include:

- Techniques for testing non-aqueous or highly interfering substances
- (1→3)-β-D-glucan—Contamination, recognition and investigation
- Medical device extraction and validation of extraction protocols
- Regulatory considerations

Contact Global Technical Services

For course dates and fees, please contact your local ACC representative or check our website at acciusa.com. The Bacterial Endotoxin Testing Workshop schedule can be accessed from the BET Products section or from the Calendar section of the ACC website. To receive additional information or to register for a course, contact the appropriate office below.

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t 800.848.3248
e techservice@acciusa.com

UNITED KINGDOM

t (44) 151.547.7444
e TechnicalServices@acciuk.co.uk

BEST QC Microbiology Training

Bioburden, Endotoxin, Sterility Testing — Innovative educational programs designed specifically for you.

BEST is a three-day innovative educational program designed specifically for you and your laboratory staff.

This program, brought to you by ACC and MilliporeSigma, will focus on both in-process and product release quality control and will provide an overview of relevant methods in each area. Basic technical laboratory skills, however, are assumed as a prerequisite for participation. The course will consist of class presentations and demonstrations of laboratory applications. This program is only available in the US.

DAY ONE

Bioburden Testing

Dependable Tests Based on Membrane Filtration

Bioburden testing is critical for monitoring water quality and raw materials and for ensuring that manufacturing processes remain in microbiological control. During the first day of the training, you will learn about:

- Advantages and limitations of membrane filtration
- How to choose the right membrane for your application
- The regulations governing bioburden testing
- How to develop a sampling plan for bioburden testing
- How to qualify and validate a method
- How to set alert and action limits
- How to interpret bioburden test results
- How to troubleshoot membrane filtration issues
- Rapid methods for bioburden testing
- Hands-on session using a manifold and Milliflex Plus Pump

DAY TWO

Endotoxin Testing

BET Methodology & Background

The Bacterial Endotoxin Test (BET) is used for the detection and quantitation of endotoxins from gram-negative bacteria. Reagents are primarily used to test for endotoxins in injectable pharmaceuticals, biological products, and medical devices. They are also used in renal dialysis centers and a wide range of other applications. During the second day of training, you will learn:

- What are endotoxin and BET reagents
- The regulations governing bacterial endotoxin testing
- The methodology for bacterial endotoxin testing
- How to qualify a chosen BET method
- How to validate samples and how to test them routinely
- How to analyze and interpret data
- How to address sample interference
- Hands-on session
- Learn about sustainable recombinant reagents

DAY THREE

Sterility Testing

A Complete Solution for Reliable Results

Sterility testing is considered the most essential QC Microbiological test for releasing sterile final product. This test is heavily regulated and harmonized across most of the globe. During the third day of training, you will learn about:

- The history of sterility testing
- The global harmonized regulations overview
- Environmental monitoring requirements for sterility testing
- Deep dive into USP <71>
- Advantages and limitations of direct inoculation sterility testing
- Advantages and limitations of open funnel sterility testing
- Advantages and limitations of closed system sterility testing
- Overview of sterility testing media and rinse fluids
- Most common sterility questions
- Hands-on session — Steritest Equinox

Program Schedule & Fees

This program is only available in the US. For program dates and fees, please contact your local ACC representative or check our website at acciusa.com. To receive additional information or to register for a program, contact the US office below.

UNITED STATES

t 800.848.3248 | **e** techservice@acciusa.com

KINETIC ENDOTOXIN DETECTION SYSTEMS

acc
PROTECTION
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It's Official!

The US Pharmacopeia (USP) Chapter <86>, "Bacterial Endotoxins Test Using Recombinant Reagents," will allow the use of non-animal-derived reagents for endotoxin testing — which includes **PyroSmart NextGen®**.

First-Gen. **Second-Gen. NEXT-GEN.**

Wherever you are on your BET journey, we've got you covered.

BETransformed. ACC transformed endotoxin testing in 1974 with the introduction of its Pyrotell® lysate gel-clot reagent and then again with its chromogenic and turbidimetric tests, Pyrochrome® and Pyrotell®-T.

Now, we are transforming the industry again with **PyroSmart NextGen®**, a groundbreaking recombinant BET solution with all of the quality and consistency you have come to expect from our traditional LAL reagents.

As you navigate your own transformation journey — from qualitative to quantitative to recombinant — count on ACC for the highest-quality products and support.

Learn more at **acciusa.com/BETransformed**.

PyroSmart®
NEXTGEN Recombinant Cascade Reagent (rCR)

Kinetic Chromogenic Method Recombinant Reagent

PyroSmart®
NEXTGEN Recombinant Cascade Reagent (rCR)

PyroSmart NextGen® recombinant cascade reagent (rCR) marks the introduction of a new sustainable recombinant LAL reagent technology for bacterial endotoxin testing (BET). Utilizing the same LAL cascade as traditional LAL reagents while eliminating the potential for (1→3)-β-D-glucan cross-reactivity, PyroSmart NextGen® delivers all of the quality and consistency of results you have come to expect from ACC LAL reagents.

The US Pharmacopeia (USP) Chapter <86> "Bacterial Endotoxins Test Using Recombinant Reagents" will allow the use of non-animal-derived reagents for endotoxin testing. With this approval, we can help our customers transition from naturally sourced BET reagents to PyroSmart NextGen®, a shift that will strengthen the supply chain and enhance sustainability.

PyroSmart NextGen® can be used for a wide variety of endotoxin tests, ranging from standard water testing to samples requiring high sensitivity, such as intrathecal products and those requiring high dilutions to overcome interference.

Sensitivity

The sensitivity for recombinant chromogenic assays is determined by the lowest standard concentration on the standard curve used for the assay. The maximum sensitivity of PyroSmart NextGen® is 0.005 EU/mL when run in an incubating microplate reader (or 0.001 EU/mL when run in Pyros Kinetix® Flex tube reader).

Sample to Lysate Ratio

PyroSmart NextGen® is used with an economical volume of 50 µL of reagent per well, yielding 50 tests/vial:

- *Microplate reader:*
  1:1 ratio using 50 µL of test sample : 50 µL of reagent

Performing the Test

The PyroSmart NextGen® reaction mixture is incubated at 37±1°C and read in a microplate reader equipped with a 405–410 nm filter. The time of incubation is dependent on the lowest standard concentration in the standard curve, with 0.005 EU/mL achievable in 2,500 seconds in a microplate reader. Software is used to construct the standard curve and calculate the endotoxin concentrations.

Reconstitution

PyroSmart NextGen® is provided as co-lyophilized with the chromogenic substrate. As such, it is ready to use following a simple reconstitution (using 2.8 mL of the supplied reconstitution buffer).

Stability

PyroSmart NextGen® is a lyophilized product with an excellent shelf life of 3 years from the date of manufacture.

Packaging

PyroSmart NextGen® reagent is provided as a pack of 2 vials of reagent and 2 vials of reconstitution buffer. This is sufficient for a total of 110 wells (55 wells per vial).

Kinetic Chromogenic Method Recombinant Reagent

Continued

Keep Your Method. Make an Impact.

PyroSmart NextGen® is a sustainable recombinant cascade reagent (rCR) that delivers the same reliable results as your conventional LAL reagent and offers these additional advantages:

- No animal content — horseshoe-crab-blood-free
- Same cascade
- No cross-reactivity with (1→3)-β-D-glucan
- Same instrument
- Same preparation steps
- Meets your sustainability objectives
- Approved methodology under USP Chapter <86>, "Bacterial Endotoxins Test Using Recombinant Reagents"

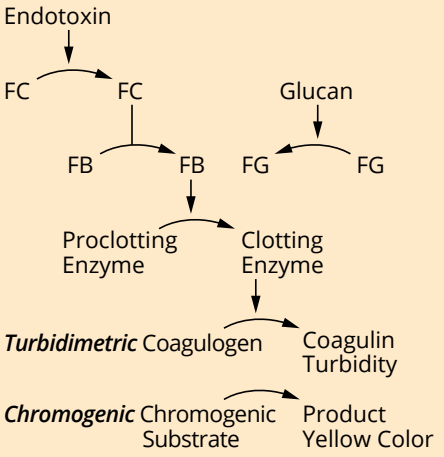
ACC's PyroSmart NextGen® uses the same cascade as traditional LAL reagents by manufacturing the factors responsible for the cascade using recombinant processes. As a result, our new recombinant reagent's mechanism of action will deliver results consistent with traditional LAL reagents. It offers the added advantage of eliminating (1→3)-β-D-glucan cross-reactivity from the LAL cascade, since there is no Factor G in the final reagent. ACC developed PyroSmart NextGen® to provide a sustainable alternative to traditional, naturally sourced LAL reagents, while allowing customers to maintain their lab procedures, methods, instrumentation, and, most importantly, their results.

LAL Reagent Comparison — The Benefits Are Clear

	Traditional LAL Reagent	ACC's PyroSmart NextGen® Recombinant Cascade Reagent (rCR)	Competitor Recombinant Factor C Reagent (rFC)
Year Technology Introduced	1977	**2021**	2003
Kinetic Assay	✓ Yes — Kinetic	✓ **Yes — Kinetic**	✗ No — Endpoint only
Assay Setup	✓ Single Step Reconstitution	✓ **Single Step Reconstitution**	✗ No — rFC requires three reagents in a 1:4:5 ratio and a 10-minute pre-incubation step
Same Standard Plate Reader	✓ Yes — Incubating plate or tube reader at 405 nm	✓ **Yes — Incubating plate or tube reader at 405 nm**	✗ No — Fluorescent reader required
Derived From Limulus Amebocyte Lysate (LAL)	✓ Yes — LAL	✓ **Yes — rCR is recombinant LAL**	✗ No — Based on Carcinoscorpius or Tachypleus Amebocyte Lysate (CAL or TAL)
Multi-step Cascade Pathway	✓ Yes	✓ **Yes**	✗ No
Endotoxin Specific	✗ No	✓ **Yes**	✓ Yes
Sustainable Reagent (animal free)	✗ No	✓ **Yes — Horseshoe-crab-blood-free**	✓ Yes — Horseshoe-crab-blood-free

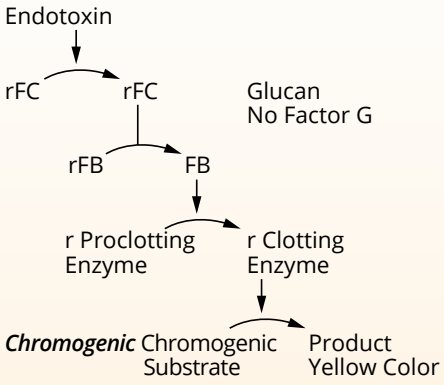
The Importance of Mechanism of Action Recombinant Cascade Reagent (rCR)

TRADITIONAL LAL REAGENT



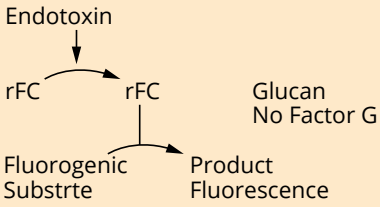
In the presence of endotoxin, Factor C becomes an activated moiety that in turn activates Factor B and the proclotting enzyme, ultimately resulting in the proteolytic cleavage of a substrate (either coagulogen in gel clot and turbidimetric assays or a colorless chromogenic substrate in chromogenic assays). The cascade mechanism thus amplifies the response of Factor C and leads to an exceptional sensitivity for this biological assay, with kinetic output being preferable. In the presence of (1→3)-β-D-glucan, Factor G becomes an activated moiety that also activates the proclotting enzyme, resulting in the same signal as that triggered by endotoxins through Factor C. This has been often observed as glucan-derived enhancement or false positive results.

RECOMBINANT CASCADE REAGENT (rCR)



As with naturally sourced LAL reagents, in the presence of endotoxin, recombinant Factor C becomes an activated moiety that in turn activates recombinant Factor B and the recombinant proclotting enzyme, ultimately resulting in the proteolytic cleavage of a colorless chromogenic substrate formulated with PyroSmart NextGen®. By relying on the same cascade mechanism, the response of recombinant Factor C is amplified the same way as by LAL reagents and thus the same sensitivity is achieved using this kinetic assay. Due to absence of Factor G, PyroSmart NextGen® will not react with any (1→3)-β-D-glucan and therefore will prevent glucan-derived enhancement and false positive results.

RECOMBINANT FACTOR C REAGENT (rFC)



Launched almost two decades ago, rFC reagents rely only on a recombinant form of Factor C. Due to the absence of the cascade as the amplification mechanism, rFC reagents are paired with a fluorescence method instead. However, this constitutes a different measured entity, different instrumentation, and different preparation steps with a limited output (endpoint assay only). Therefore, the uptake and implementation of this method has been rather limited.

Converting to PyroSmart NextGen® Is Easy

Switching to this sustainable alternative is easy because PyroSmart NextGen® follows the same cascade pathway as traditional reagents.

Kinetic Chromogenic Method Reagents

Pyrochrome®

Kinetic Chromogenic LAL Reagent

Pyrochrome® can be used for a wide variety of sample types, ranging from standard water testing to samples requiring high sensitivity, such as intrathecal products and those requiring high dilutions to overcome interference.

The BET reagent is formulated with a synthetic substrate that produces a chromophore when cleaved by endotoxin-activated enzyme. The test is read in a tube reader or an incubating microplate reader.

Sensitivity

The maximum sensitivity of Pyrochrome® is 0.001 EU/mL when run in Pyros Kinetix® Flex tube reader or incubating microplate reader with Glucashield® Buffer.

Sample to BET Ratio

In the Pyros Kinetix® Flex tube reader, Pyrochrome® can be used at an economical ratio of 4:1 using 50 µL of reagent per well or at 1:1 using 100 µL/well.

In a microplate reader, the reagent is used at a ratio of 1:1 and a volume of 50 µL/well (60 tests/vial) or 100 µL/well (30 tests/vial).

Performing the Test

The Pyrochrome® sample mixture is incubated in an optical reader at 37±1˚C and read at a wavelength of 405 nm. No pre-incubation is required and results can be available within 1 hour. However, time to results is dependent on the required assay sensitivity. Software will analyze the data to provide endotoxin results.

Reconstitution

Pyrochrome® lysate is reconstituted with an optimized Pyrochrome® reconstitution buffer (C1500-5). Pyrochrome® can also be reconstituted with Glucashield® buffer (CG1500-5), a (1→3)-β-D-glucan-inhibiting buffer, to render the assay endotoxin specific.

Stability

Once reconstituted, Pyrochrome® is stable for 8 hours when stored at 2–8˚C.

Packaging

Pyrochrome® is offered with a choice of reconstitution buffer and is recommended for use with the 10 ng/vial Control Standard Endotoxin (CSE, EC010-5). Certificates of Analysis, specific to the Pyrochrome® and CSE lot, can be obtained from ACC or online at acciusa.com.

Chromo-LAL

Kinetic Chromogenic Formulation

Chromo-LAL is optimized for the kinetic chromogenic BET test method in microplate readers. Chromo-LAL is a buffered, stable and robust lysate, suitable for quantitative testing of a wide range of samples.

Sensitivity

The sensitivity for chromogenic assays is determined by the lowest standard concentration on the standard curve used for the assay. The maximum sensitivity of Chromo-LAL is 0.005 EU/mL.

Sample to BET Ratio

Reconstituted Chromo-LAL reagent is used at a ratio of 1:1 and a volume of 100 µL/well (30 tests/vial).

Performing the Test

The Chromo-LAL/sample mixture is incubated at 37±1°C and read in a microplate reader. Software is used to construct the standard curve and calculate the endotoxin concentrations.

Reconstitution

Chromo-LAL lysate is reconstituted with BET Reagent Water (LRW). It can also be reconstituted with Glucashield® buffer, a (1→3)-β-D-glucan-inhibiting buffer, to render the assay endotoxin specific.

Stability

Once reconstituted, Chromo-LAL is stable for 24 hours if stored at 2–8°C. Chromo-LAL may be frozen once and will retain activity for 2 weeks if stored at or below -20°C.

Packaging

Each vial contains reagent for approximately 30 tests. It is recommended for use with 0.5 µg/vial Control Standard Endotoxin (CSE, E0005-1). Certificates of Analysis, specific to the Chromo-LAL and CSE lot, can be obtained from ACC or online at acciusa.com.

Kinetic Turbidimetric Method Reagent

Pyrotell®-T

Kinetic Turbidimetric LAL Reagent

Pyrotell®-T turbidimetric reagent formulation is a versatile and cost-effective solution for the determination of endotoxin. The optical density (turbidity) increase that accompanies the clotting reaction is read in the Pyros Kinetix® Flex tube reader or in an incubating microplate reader.

When used with the Pyros Kinetix® Flex tube reader, Pyrotell®-T is a highly economic, flexible, and sensitive BET assay. It can be used for a wide variety of tests, ranging from water testing to samples requiring high sensitivity, such as intrathecal products and those requiring high dilutions to overcome interference.

Product Sensitivity

When used in a Pyros Kinetix® Flex tube reader, the maximum sensitivity is 0.001 EU/mL. The unique formulation of Pyrotell®-T allows a wide selection of standard curves to be used, giving the user flexibility, speed, and ease in performing assays.

Sample to BET Ratio

The ratio of sample to BET is determined by personal preference and sample chemistry (interference patterns). Reconstituted Pyrotell®-T reagent is used at a sample to lysate ratio of 1:1 or 4:1 and volume of 100 µL/well (48 tests/vial) or 50 µL/well (96 tests/vial), respectively.

Performing the Test

The Pyrotell®-T sample mixture is incubated in an optical reader at 37±1°C and read at a desired wavelength depending on the instrumentation and user choice. The time of incubation is dependent on the lowest standard concentration in the standard curve. Software is used to analyze the standard curve and calculate the endotoxin concentrations.

Reconstitution

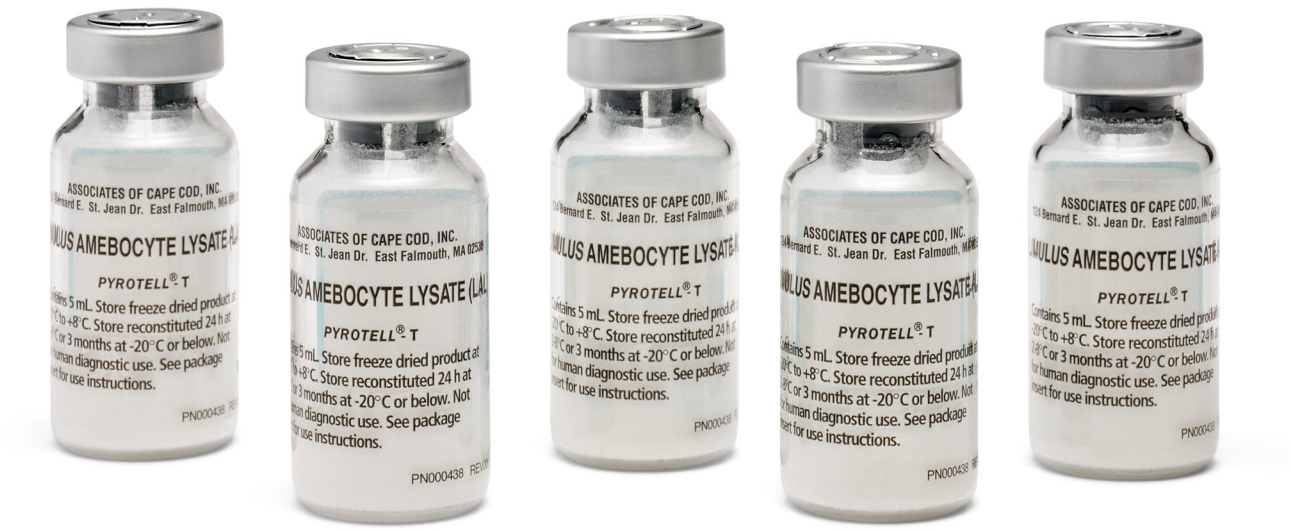
Pyrotell®-T may be reconstituted with 5 mL of LAL Reagent Water (LRW), Pyrosol® buffer, or Glucashield® buffer, depending on the demands of the sample being tested. Pyrosol® buffer provides improved kinetics and extra pH buffering capacity. Glucashield® buffer, a (1→3)-β-D-glucan-inhibiting buffer, is used to render the assay endotoxin specific.

Stability

Once reconstituted, Pyrotell®-T is stable for 24 hours, if stored at 2–8°C. Pyrotell®-T may be frozen once and will retain activity for as long as 3 months if stored at or below -20°C.

Packaging

Pyrotell®-T is available in multi-test vials. Each vial contains reagent for approximately 96 tests (when used with the Pyros Kinetix® Flex tube reader and 4:1 sample to BET ratio) or 48 tests (when used with 1:1 ratio and/or in a microplate reader). It is recommended for use with the 0.5 µg/vial Control Standard Endotoxin (CSE, E0005-1). Certificates of Analysis, specific to the Pyrotell®-T and CSE lot, can be obtained from ACC or online at acciusa.com.



Kinetic Microplate System

For Efficient & Accurate Endotoxin Testing

Epoch 2 Microplate Spectrophotometer*

The BioTek® Epoch 2, manufactured by BioTek® Instruments (now part of Agilent Technologies), is an incubating absorbance microplate reader that, along with our Pyros® eXpress 21 CFR Part 11-compliant software, provides a complete system for efficient and accurate endotoxin testing.

It delivers excellent performance for UV-Vis absorbance measurements, which can be performed in 6- to 384-well microplates, cuvettes, and in microvolume samples. The broad wavelength range enables applications from nucleic acid and protein quantification in the low UV to microbial growth assays at higher wavelengths. A 4-Zone™ Temperature Control system and unique heated track/carrier design provide for minimal evaporation and edge effect.

System Specifications

- Filter-free UV-Vis wavelength selection from 200 to 999 nm in 1 nm increments
- Compatible with 6- to 384-well microplates and cuvettes for assay versatility
- Integration with ACC's Pyros® eXpress software
- Precise reporting
- Can be used for a wide range of applications

ACC recommends that customers confirm their expected product support window directly with Agilent Technologies.

*Trademark of BioTek Instruments, Inc.

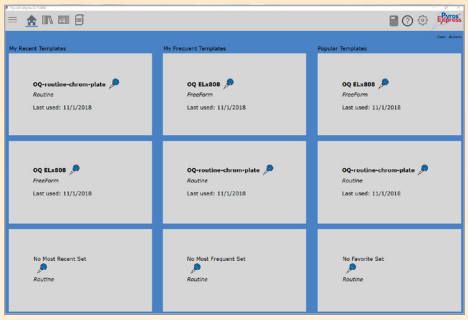
Analysis Software

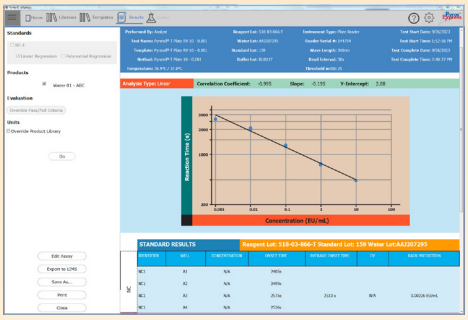
Pyros® eXpress

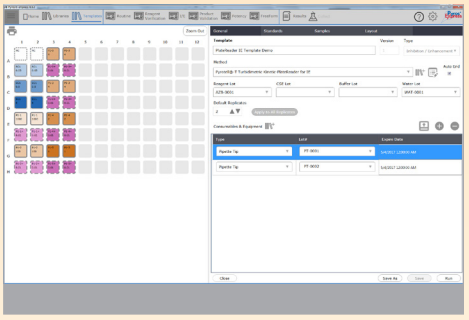
Endotoxin & Glucan Analysis Software

ACC introduces the next generation of endotoxin and glucan detection analysis software that offers integrated solutions for your quantitative endotoxin and glucan detection testing, reporting, trending, and data management needs.

Pyros® eXpress Software supports all of the quantitative endotoxin and glucan detection assays from ACC and allows users to quickly and efficiently test in a Quality Control environment. The Pyros® eXpress Software provides greater flexibility and versatility in the laboratory, allowing you to work smarter and faster while maintaining regulatory compliance. Pyros® eXpress Software meets 21CFR Part 11 technical requirements for electronic records, signatures, audit trails, as well as US and EU data integrity expectations.







EASE OF USE

- Custom templates available on the home screen provides quick-start options with minimal clicks to assay initiation.
- A fully integrated product validation workflow provides guidance for a systematic and compliant testing process.
- Custom permission settings help you control your testing environment and reduce laboratory errors:
  - » *Lysate/CSE matching to only allow the use of previously qualified reagents*
  - » *Optional technician qualification requirements*
  - » *Supply/equipment expiry safeguards*

EFFICIENCY

- Product-centric reporting with the industry plate and tube readers provides real-time results for individual samples.
- Reagent, product, and supply libraries help streamline test setup and reduce time spent on manual entry.

VERSATILITY

- Pyros® eXpress supports both plate and tube reader platforms, resulting in greater flexibility and laboratory throughput for endotoxin and glucan testing.

Kinetic System Ordering Information

PyroSmart NextGen® Multi-Test

2.8 mL/vial (approx. 50 tests/vial)

#PNG050-2	PyroSmart NextGen® with Reconstitution Buffer 2 pack (approx. 100 tests)

Pyrochrome® Test Kit

3.2 mL/vial (approx. 60 tests/vial)

#C1500-5	Pyrochrome® with Reconstitution Buffer 5 pack (300 tests)
#C1500-25	Pyrochrome® with Reconstitution Buffer 25 pack (1500 tests)
#CG1500-5	Pyrochrome® with Glucashield® Buffer 5 pack (300 tests)
#CG1500-25	Pyrochrome® with Glucashield® Buffer 25 pack (1500 tests)

Chromo-LAL

3.2 mL/vial (approx. 30 tests/vial)

#C0031-5	5 pack (150 tests)

Pyrotell®-T Test Kit

5 mL/vial (approx. 50 tests/vial)

#T0051-5	5 pack (250 tests)
#T0051-25	25 pack (1250 tests)

Control Standard Endotoxin

Escherichia coli O113:H10

#EC010-5	10 ng/vial (5 pack) for Pyrochrome®
#E0005-5	0.5 µg/vial (5 pack) for turbidimetric

Pyros Kinetix® Flex

Incubating Kinetic Tube Reader

#PKF96-PKG-D	Pyros Kinetix® Flex 96-well (includes instrument, Pyros® eXpress, validation doc & domestic power conditioner)
#PKF96-PKG-I	Pyros Kinetix® Flex 96-well (includes instrument, Pyros® eXpress, validation doc & international power conditioner)
#CAL07	On-site Calibration for Pyros Kinetix® Flex

Microplate Reader

#EPOCH2NS-SN-D	Epoch 2 Microplate Spectrophotometer (includes domestic power conditioner)
#EPOCH2NS-SN-I	Epoch 2 Microplate Spectrophotometer (includes international power conditioner)
#EPOCH2NS-SI-D	Epoch 2 Microplate Spectrophotometer (IVD) (includes domestic power conditioner)
#EPOCH2NS-SI-I	Epoch 2 Microplate Spectrophotometer (IVD) (includes international power conditioner)
#ELXP	Agilent/BioTek Universal Test Plate
#CALPR	On-site Preventative Maintenance and Performance Verification Service

Pyros® Express

Endotoxin and Glucan Analysis Software

#PEXS	Pyros® eXpress Software Package (USB media, 1 Workgroup License[1], 1 Reader License[2] and Software Support[3])
#PEXS-RL2	Pyros® eXpress Software Reader License
#PEXS-WL1	Pyros® eXpress Software Workgroup License
#PEXS-VAL-DOCS	Pyros® eXpress Software Validation Protocols (Pyros Kinetix® Flex and plate reader)
#PEXS-SUP3	Pyros® eXpress Software Annual Support
#PEXS-ADVS4	Pyros® eXpress Software Remote Advanced Support[4]
PEXS-VAL	Pyros® eXpress Software On-site Validation for Pyros Kinetix® Flex and plate reader
PEXS-OS	On-site Pyros® eXpress Software Support (plus travel expense)

1. Workgroup License: License allows software to be loaded on all computers connected to one Pyros® eXpress network database.
2. Reader License: Allows for one reader/instrument to be connected; standalone or as part of the network database.
3. Software Support can be provided through ACC's Field Service, Technical Services, and/or the Software Support Group and is provided for a period of 1 year from time of software purchase. Software support includes upgrades, patches, and basic assistance with software setup. This does not include advanced or on-site support; however, advanced and on-site support are available through our remote advanced and on-site support service offerings (refer to price list for options and pricing). Examples of basic support include, but are not limited to: assistance setting up products, accessories, and templates; running validation and endotoxin tests, trending data; software configuration of the Pyros® eXpress UI; and pre-installation and installation questions covered within the scope as defined in the software manual.
4. Advanced Support includes those support needs that are beyond scope of basic support as described above. It may require a fee for service (including travel costs). Please refer to our price list or speak with your Account Manager or Field Service Support Representative for pricing information. Examples of Advanced Support include, but are not limited to: database setup, maintenance, and troubleshooting; network, security, and firewall troubleshooting; report customization and import or export setup with external systems, such as environmental monitoring systems or laboratory information management systems.

The gel-clot test does not require sophisticated capital equipment and software and is the simplest LAL test to implement. The format allow the user to perform assays within minutes, provides rapid results and is especially convenient for research, testing water and dialysate.

GEL-CLOT ENDOTOXIN DETECTION TESTING

The Original Gel-Clot Assay

Pyrotell®

Gel-Clot LAL Reagent

ACC's Pyrotell® was the first BET reagent licensed by the US FDA. It is easy to use and is available in both economical Multi-Test Vials (MTVs) and convenient Single Test Vials (STVs). Pyrotell® is a robust reagent, producing firm, easily read clots and is resistant to interfering substances. The gel-clot test does not require sophisticated equipment and software and is the simplest BET test to implement.

Sensitivity

Pyrotell® is available in a variety of sensitivities: 0.03 EU/mL; 0.06 EU/mL; 0.125 EU/mL; and 0.25 EU/mL.

Sample to BET Ratio

Reconstituted Pyrotell® reagent is used at a ratio of 1:1 and a volume of 100 µL/test.

Performing the Test

For 5 mL MTV, 100 µL of lysate is mixed with 100 µL of sample in a reaction tube. For STV, 200 µL of sample is added to the vial, which serves as a reaction tube. Test tubes are incubated at 37±1°C for 60 minutes ± 2 minutes. A positive test is indicated if the clot remains solid after the inversion of the test tube.

Reconstitution

Pyrotell® MTV may be reconstituted with BET Reagent Water (LRW), Pyrosol® buffer or Glucashield® buffer, a (1→3)-β-D-glucan-inhibiting buffer, to render the assay endotoxin specific. Pyrotell® STV is reconstituted by the sample being tested.

Stability

Once reconstituted Pyrotell® MTV is stable for 24 hours if stored at 2–8°C. Pyrotell® MTV may be frozen once and will retain activity for as long as 3 months if stored at or below -20°C. STVs are used immediately upon addition of the sample.

Packaging

Pyrotell® is available in 5 mL (approx. 50 tests/vial) MTV and STV sizes. STVs are sold in 5x10 vial packs. Certificates of Analysis, specific to the Pyrotell® and CSE lot, can be obtained from ACC or online at acciusa.com. It is recommended for use with 0.5 µg/vial Control Standard Endotoxin (E0005-1). See page 28 for product vial test quantities.

PYROTELL® SINGLE TEST VIALS

PYROTELL® MULTI-TEST VIALS

Pyrosate®

Rapid Endotoxin Detection Kit

The Pyrosate® kit is an easy-to-use, FDA-licensed BET gel-clot test allowing for BET-compliant endotoxin testing. The assay does not require special training or laboratory supplies and the step-by-step illustrated instructions allow the user to perform assays within minutes. The Pyrosate® kit provides rapid results and is especially convenient for research, testing water, and dialysate.

Sensitivity

The Pyrosate® kit is available in sensitivities of 0.25 EU/mL, 0.125 EU/mL and 0.03 EU/mL. The test may be as short as 30 minutes, depending on the sensitivity.

Performing the Test

The Pyrosate® kit is a rapid gel-clot test that contains a 2λ* endotoxin tube (PPC) matched to the sample tube (SPL) for each sensitivity. This feature is unique to the Pyrosate® assay. The endotoxin tube (PPC) assures that the sample does not interfere with the test, ruling out false negatives. Pyrosate® is formulated to eliminate false positives due to (1→3)-β-D-glucan. This endotoxin-specific reagent does not require additional blocking buffers.

Reconstitution

Pyrosate® is reconstituted directly with the sample by adding 0.5 mL to the sample tube (SPL). After approximately 60 seconds of gentle mixing, 0.25 mL is transferred to the endotoxin tube (PPC). The lot-specific incubation time at 37±1°C is given on the Certificate of Compliance.

Stability

Pyrosate® is stable at room temperature and does not require refrigeration for shipping or storage.

Product Applications

- Hemodialysis
- Water and Water Systems
- Filter Industry
- Research
- Final Product

Product Benefits

- Shorter Assay Time
- Endotoxin Specific
- No Dilutions Required
- No Refrigeration Required
- Matched Positive Product Control

Packaging

The Pyrosate® kit is available in a 10 test kit and a 30 test bulk package for each sensitivity. Each kit contains sample test tubes (SPL) and endotoxin test tubes (Positive Product Control-PPC). A Certificate of Analysis, specific to the Pyrosate® and CSE lot, can be obtained from ACC or online at acciusa.com.

*λ (lambda) is the lowest concentration of endotoxin to cause a positive test result under standard conditions.

Gel-Clot Testing Ordering Information

Pyrotell®

Multi-Test Vial (MTV), 5 mL/vial (approx. 50 tests/vial)	
#G5003-5	0.03 EU/mL (250 test 5 pack)
#G5003-25	0.03 EU/mL (1250 test 25 pack)
#G5006-5	0.06 EU/mL (250 test 5 pack)
#G5006-25	0.06 EU/mL (1250 test 25 pack)
#G5125-5	0.125 EU/mL (250 test 5 pack)
#G5125-25	0.125 EU/mL (1250 test 25 pack)
#G5250-5	0.25 EU/mL (250 test 5 pack)
#G5250-25	0.25 EU/mL (1250 test 25 pack)

Single Test Vial (STV), 0.2 mL/vial	
#GS003-5	0.03 EU/mL (five 10 vial packs)
#GS006-5	0.06 EU/mL (five 10 vial packs)
#GS125-5	0.125 EU/mL (five 10 vial packs)
#GS250-5	0.25 EU/mL (five 10 vial packs)

Endotoxin Standards

For use in standard preparation and for depyrogenation control vials.

#E0005-1	0.5 µg/vial (1 vial)
#E0005-5	0.5 µg/vial (5 pack)
#E0125-1	125 µg/vial (1 pack)
#E0125-5	125 µg/vial (5 pack)
#EC010-5	10 ng/vial, (5 pack) *(for use with Pyrochrome® kits)*

Pyrosol® LAL Reconstitution Buffer

#BR051-5	Pyrosol® Buffer with pH indicator (gel-clot only), 5.5 mL/vial (5 pack)
#BR051-25	Pyrosol® Buffer with pH indicator (gel-clot only), 5.5 mL/vial (25 pack)
#BC051-5	Pyrosol® Buffer without pH indicator 5.5 mL/vial (5 pack)
#BC051-25	Pyrosol® Buffer without pH indicator 5.5 mL/vial (25 pack)
#BC554-1	Pyrosol® Buffer without pH indicator 55 mL/vial (1 pack)

Glucashield® Buffer

Glucashield® Buffer is used to reconstitute LAL and render the reagent insensitive to (1→3)-β-D-glucan interference by effectively blocking the Factor G pathway of the endotoxin clotting cascade. For use with Pyrotell® Multi-Test Vials, Pyrotell®-T, Pyrochrome®, and Chromo-LAL.

#GB051-5	Glucashield® Buffer, 5.5 mL/vial (5 pack)
#GB051-25	Glucashield® Buffer, 5.5 mL/vial (25 pack)

Pyrosate® Kit

Includes sample test tubes and positive product control test tubes. *Disposable transfer pipettes (PPT50) sold separately.*

#PSD030-10	Pyrosate® 0.03 EU/mL (10 Test Kit)
#PSD030-30	Pyrosate® 0.03 EU/mL (30 Test Kit)
#PSD125-10	Pyrosate® 0.125 EU/mL (10 Test Kit)
#PSD125-30	Pyrosate® 0.125 EU/mL (30 Test Kit)
#PSD250-10	Pyrosate® 0.25 EU/mL (10 Test Kit)
#PSD250-30	Pyrosate® 0.25 EU/mL (30 Test Kit)

Accessory Products*

LAL Reagent Water (LRW)

LRW is intended for reconstitution of BET reagents, CSE, and to dilute samples and standards for BET assays. LRW is not for human or animal injection. LRW contains less than 0.001 EU/mL endotoxin and less than 1.56 pg/mL glucan.

#W0051-10	5.5 mL/bottle, 10 bottles/pack
#W020P	20 mL/bottle, 10 bottles/pack
#WP050C	50 mL/plastic bottle, 30 bottles/pack
#WP100C	100 mL/plastic bottle, 30 bottles/pack
#WP500C	500 mL/plastic bottle, 12 bottles/pack
#WP1000C	1L/plastic bottle, 12 bottles/pack

Pyrotubes®	
#TK100-10	8 x 75 mm borosilicate glass for Pyros Kinetix®, 50 tubes/pack, 10 packs/carton
#TS050-10	10 x 75 mm soda lime glass for gel-clot method, 52 tubes/pack, 10 packs/carton
#TB050-5	10 x 75 mm borosilicate glass for turbidimetric method, 52 tubes/pack, 5 packs/carton
#TB013-5	13 x 100 mm borosilicate glass, 18 tubes/pack, 5 packs
#TB16C	16 x 90 mm depyrogenation tubes with aluminum caps, 65/pack
#WP1000C	1L/plastic bottle, 12 bottles/pack

Pipette Tips	
#PPT25	250 µL tips, 96 tips/box, 10 boxes/pack
#PPT10	1000 µL tips, 96 tips/box, 8 boxes/pack
#PPT50	Disposable Transfer Pipettes 50/pack *(for use with Pyrosate® kits)*

*Availability of ancillary products varies depending upon the local office.

GLUCAN DETECTION

Glucan Detection

Glucatell® Kit

(1→3)-β-D-Glucan Detection

The Glucatell® kit is specific for detection of (1→3)-β-D-glucan (BG). BG is considered a contaminant in parenteral drugs, solutions, and medical devices due to BG's bioactivity as an activator of innate immunity and its capacity to enhance bacterial endotoxin tests.

The Glucatell® assay is based upon a modification of the Limulus Amebocyte Lysate (LAL) pathway. Glucatell® reagent is processed to eliminate Factor C, and is therefore specific for (1→3)-β-D-glucan. The reagent does not react with other polysaccharides, including beta-glucans with different glycosidic linkages. Glucatell® is a chromogenic reagent that may be used to perform either kinetic or endpoint assays in microplate readers. Literature references to the bioactivity of BG may be found at acciusa.com/pdfs/BG_Biol_Activity_Ref_List_PR16023.pdf.

Sensitivity

The sensitivity for Glucatell® assay is determined by the lowest standard concentration on the standard curve used for the assay. The maximum sensitivity for Glucatell® is 3.125 pg/mL when used with a microplate reader.

Sample to Glucatell® Ratio

- *Kinetic Assay:* Reconstituted Glucatell® reagent is used at a ratio of 1:4 and a volume of 100 µL/well (55 tests/vial).
- *Endpoint Assay:* Reconstituted Glucatell® reagent is used at a ratio of 1:1 and a volume of 50 µL/well (55 tests/vial).

Performing the Test

- *Kinetic Assay:* The Glucatell®/sample mixture is incubated at 37±1°C in a microplate reader. Software is used to construct the standard curve and calculate glucan concentrations.
- *Endpoint Diazo Assay:* The Glucatell®/sample mixture is incubated at 37±1°C in a microplate heating block for the recommended time period. 50 µL each of the three diazo reagents are then added to the mixture. Software is used to construct the standard curve and calculate glucan concentrations.

Reconstitution

Glucatell® reagent can be reconstituted differently depending on the assay you use.

- *Kinetic Assay:* Combine 2.8 mL each of Pyrosol® and reagent grade water.
- *Endpoint Assay:* Use 2.8 mL of only Pyrosol® reconstitution buffer.

Stability

Store all reagents at 2–8°C in the dark. Once reconstituted, Glucatell® reagent should be stored at 2–8°C and used within 2 hours. Alternatively, reconstituted Glucatell® reagent can be frozen at -20°C for 20 days, thawed once and used. The diazo reagents should be used the day they are prepared.

Product Applications

- Analyzing final products for (1→3)-β-D-glucan
- Investigating BET Out-of-Specification results
- Qualifying raw materials
- Monitoring cellulosic filter extractables
- Monitoring fungal fermentation processes
- Analyzing fermentation and cell culture media
- Monitoring airborne glucan burden

Packaging

The Glucatell® kit is available as either an endpoint or kinetic chromogenic assay for use in microplates. The kit contains the Glucatell® reagent, a (1→3)-β-D-glucan standard, buffer, glucan-free water, glucan-free microplates, and diazo reagents (endpoint kit only).

Glucan Detection Ordering Information

Glucatell® Kit

#GT002	Kinetic assays, 110 tests
#GT003	With diazo reagents for endpoint assays, 55 tests
#GT004	Kinetic assays, 55 tests

Microplate Reader

#EPOCH2NS-SN-D	Epoch 2 Incubating Microplate Reader (software sold separately)

Pyros® Express

Endotoxin and Glucan Analysis Software

#PEXS	Pyros® eXpress Software Package (USB media, 1 Workgroup License[1], 1 Reader License[2] and Software Support[3])

Accessory Products

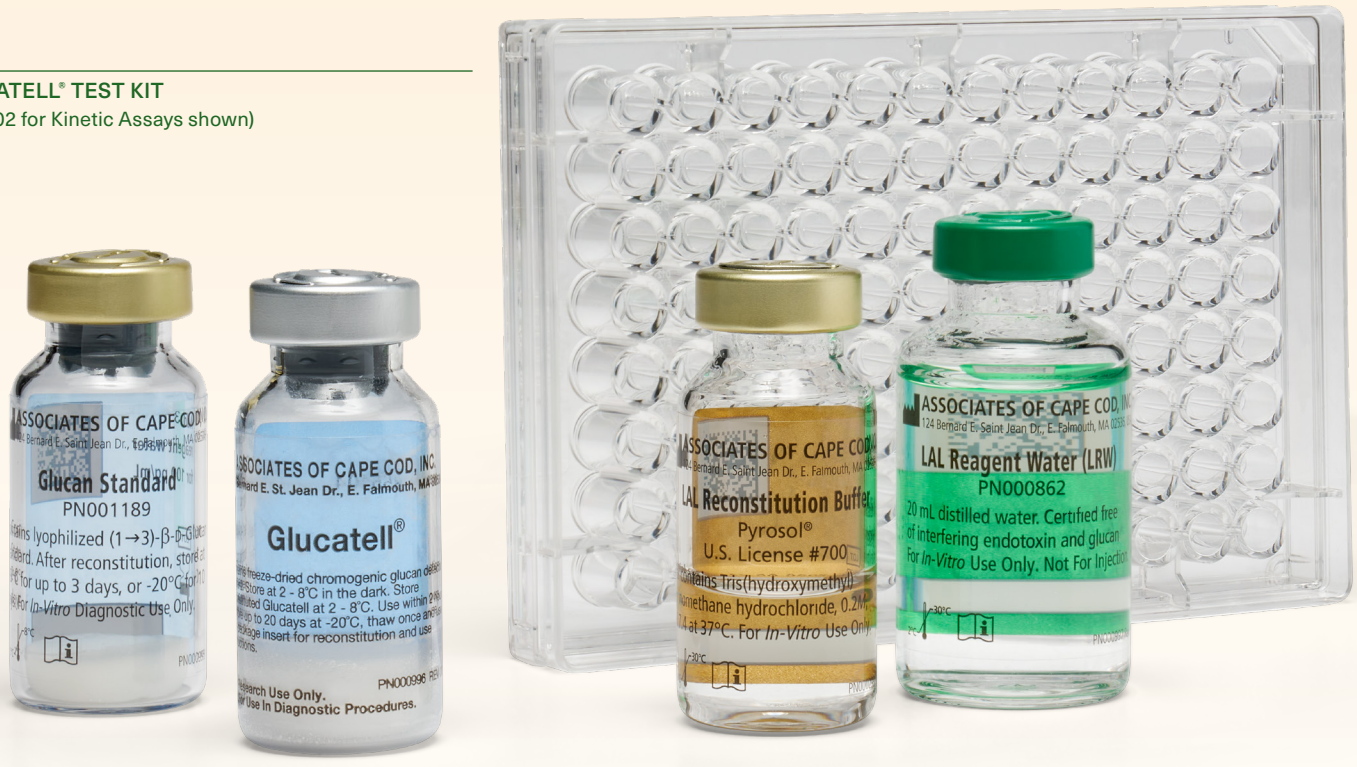
Pipette Tips

#PPT25	250 µL tips, 96 tips/box, 10 boxes/pack
#PPT10	1000 µL tips, 96 tips/box, 8 boxes/pack

Pyrotubes®

#TB013-5	13 x 100 mm borosilicate glass (for dilutions only) 18 tubes/pack, 5 packs/carton

GLUCATELL® TEST KIT
(#GT002 for Kinetic Assays shown)



ACC's Pyroclear® brand BET accessory products are certified to be free of interfering endotoxin and (1→3)-β-d-glucan contamination.

BET ACCESSORY PRODUCTS

Accessory Products

Disposable Products

Pyroclear®

Pyroclear® brand products are the first disposables in the industry that are certified to be free of interfering endotoxin and (1→3)-β-D-glucan contamination. Pyroclear® products include depyrogenated test tubes, 96-well microplates, pipette tips, and LAL Reagent Water. These products are designed to reduce Out-of-Specification (OOS) investigations due to contaminated consumables.

LAL Reagent Water (LRW)

LRW is intended for reconstitution of BET reagents and CSE, and to dilute samples and standards for BET assays. LRW is not for human or animal injection. LRW contains less than 0.001 EU/mL endotoxin and less than 1.56 pg/mL glucan.

#W0051-10	5.5 mL/bottle, 10 bottles/pack
#W020P	20 mL/bottle, 10 bottles/pack
#WP050C	50 mL/plastic bottle, 30 bottles/pack
#WP100C	100 mL/plastic bottle, 30 bottles/pack
#WP500C	500 mL/plastic bottle, 12 bottles/pack
#WP1000C	1L/plastic bottle, 12 bottles/pack

Pyrotubes®

#TK100-10	8 x 75 mm borosilicate glass for Pyros Kinetix® Flex, 50 tubes/pack, 10 packs/carton
#TS050-10	10 x 75 mm soda lime glass for gel-clot method, 52 tubes/pack, 10 packs/carton
#TB050-5	10 x 75 mm borosilicate glass for turbidimetric method, 52 tubes/pack, 5 packs/carton
#TB240-5	12 x 75 mm borosilicate glass (for dilutions only), 42 tubes/pack, 5 packs/carton
#TB013-5	13 x 100 mm borosilicate glass, 18 tubes/pack, 5 packs
#TB16C	16 x 90 mm depyrogenation tubes with aluminum caps, 65/pack

Pyroplates®

#CA961-10	96-well microplate, 10 pack
#CA961-50	96-well microplate, 50 pack

Precision Pipette Tips

#PPT25	250 µL tips, 96 tips/box, 10 boxes/pack
#PPT10	1000 µL tips, 96 tips/box, 8 boxes/pack

Reconstitution Buffers

Pyrosol® LAL Reconstitution Buffer

Pyrosol® is an FDA-licensed buffer for reconstituting Pyrotell® Multi-Test Vial or Pyrotell®-T reagents. It is used when testing electrolytes, strongly buffered solutions (especially bicarbonate buffers), and solutions for which it is difficult to adjust pH into the required range. Pyrosol® buffer is also available with a pH indicator for gel-clot applications.

#BR051-5	Pyrosol® Buffer with pH indicator (gel-clot method only), 5.5 mL/vial (5 pack)
#BR051-25	Pyrosol® Buffer with pH indicator (gel-clot method only), 5.5 mL/vial (25 pack)
#BC051-5	Pyrosol® Buffer without pH indicator, 5.5 mL/vial (5 pack)
#BC051-25	Pyrosol® Buffer without pH indicator, 5.5 mL/vial (25 pack)
#BC554-1	Pyrosol® Buffer without pH indicator, 55 mL/vial (1 pack)

Glucashield® (1→3)-β-D-Glucan Inhibiting Buffer

Glucashield® buffer is used to reconstitute LAL and render the reagent insensitive to (1→3)-β-D-glucan interference by effectively blocking the Factor G pathway of the endotoxin clotting cascade. For use with Pyrotell® Multi-Test Vials, Pyrotell®-T, Pyrochrome®, and Chromo-LAL.

#GB051-5	Glucashield® Buffer, 5.5 mL/vial (5 pack)
#GB051-25	Glucashield® Buffer, 5.5 mL/vial (25 pack)

Control Standard Endotoxin (CSE)

Control Standard Endotoxin (CSE) is a standard for endotoxin testing. It is a purified extract from *E. coli* O113:H10, the same strain used for the US Pharmacopeia and the European Pharmacopeia Reference Standard Endotoxin (RSE).

CSE is an economic alternative to the RSE. CSEs are standardized against the RSE as indicated on the Certificate of Analysis, so that results can be reported in Endotoxin Units (EU) and International Units (IU). CSE can be used for all routine BET testing. A 10 ng/vial CSE is made specifically for use with our Pyrochrome® chromogenic reagent.

Performing the Test

CSE is used to make standard curves and controls when performing the BET assay. The concentrations used are dependent on the type of assay and, for photometric methods (chromogenic and turbidimetric), the detection range required.

Reconstitution

CSE is reconstituted with LAL Reagent Water (LRW). Please refer to the Certificate of Analysis when using CSE. A Certificate of Analysis for each CSE-LAL lot combination can be obtained from ACC or online at acciusa.com.

Depyrogenation Controls

In addition to their use as standards for controlling BET tests, the 0.5 µg and 125 µg CSEs can be used for validation of depyrogenation processes. They may be used directly, without reconstitution, as depyrogenation indicators (recommended for 0.5 µg) or can be reconstituted and endotoxin added to challenge articles (recommended for 125 µg).

Stability

Once reconstituted, CSE stored at 2–8°C is stable for maximum storage time for the different CSE preparations as listed below:

- 10 ng/vial — 7 days
- 0.5 µg/vial — 4 weeks
- 125 µg/vial — 3 months

CSE should not be frozen.

Product Benefits

- CSE is a stable preparation of endotoxin that can be used in all BET testing
- CSE E0005-1 and E0125-1 can be used for depyrogenation studies
- Certificates of Analysis for each CSE-LAL lot pairing gives a potency that is specific to the unique lot combination
- CSE can be reconstituted to achieve specific endotoxin concentrations

Control Standard Endotoxin

Escherichia coli O113:H10

#E0005-1	0.5 µg/vial (1 pack)
#E0005-5	0.5 µg/vial (5 pack)
#E0125-1	125 µg/vial (1 pack)
#E0125-5	125 µg/vial (5 pack)
#EC010-5	10 ng/vial (5 pack)

Our Contract Test Services team performs all methods of the BET assay: gel-clot, chromogenic, and turbidimetric.

CONTRACT TEST SERVICES

Your Endotoxin Experts

Sensitivity, Flexibility and Compliance in Bacterial Endotoxin Testing

Contract Test Services (CTS) Laboratory

ACC specializes in testing for endotoxin and glucan contamination and has notable experience in endotoxin testing. CTS has been performing all methods of the BET assay — recombinant, chromogenic, turbidimetric, and gel-clot — since 1979.

CTS is GMP-compliant and ISO-registered. We're licensed by the DEA as a laboratory capable of handling all controlled drug substances except those included in Schedule I. Endotoxin testing can be performed in accordance with FDA, US Pharmacopeia (USP), European Pharmacopoeia (EP), and/or Japanese Pharmacopoeia (JP), depending on client specifications.

Laboratory services and Inter-Laboratory Performance Qualification (ILPQ) services are also available out of our UK offices. See page 39 for office contact information.

In addition to routine testing, CTS has extensive expertise and the ability to:

- Perform low endotoxin recovery (LER) studies/protocols
- Customize endotoxin testing to individual client needs
- Develop methods for difficult samples
- Develop and/or transfer BET test methods
- Design and produce custom depyrogenation controls for oven validations

CTS has experience with diverse sample types, including:

- mRNA pharmaceuticals
- Vaccines
- Pharmaceutical drugs, including Class II controlled substances, compounded pharmaceuticals and anti-cancer drugs
- Liposomal drug products
- Medical devices
- Veterinary products
- Oligonucleotide drug products
- e-Cigarettes Vaping Products
- Dialysate
- Water
- Air quality samples
- Filters
- Cosmetics
- Food products
- Tobacco products
- Machine oils
- Raw materials
- Clinical research samples

CTS offers fast processing for routine samples, accurate and reliable test results, and full client confidentiality. After sample test results are reviewed, a written report is sent to the client. The client also receives an electronic copy of the report as a PDF.

CTS Qualifications

- GMP Compliant Laboratory (FDA and 2003/94/EC)
- ISO 13485:2016 Registered
- FDA Inspected
- DEA Licensed

Test Methods

- *Chromogenic* — Color formation is used to quantitate endotoxin (maximum sensitivity 0.001 EU/mL) and glucan
- *Turbidimetric* — The most sensitive turbidimetric endotoxin test available in the industry (maximum sensitivity 0.001 EU/mL)
- *Gel-Clot* — The original BET assay and the method of reference in most reference manuals (maximum sensitivity 0.03 EU/mL)
- *Glucatell*® — Glucan testing to quantitate the amount of (1→3)-β-D-glucan in samples

Test Types

- *Preliminary Test* — This test is used to quantify the amount of endotoxin or glucan present in a test sample using a known set of conditions. A series of dilutions are made in order to find a valid testing dilution that can be used to calculate the endotoxin or glucan concentration in a sample.
- *USP/EP Test for Interfering Factors (Validation)* — This test is used to demonstrate that the product does not interfere with the BET assay. This test is performed at a dilution not exceeding the Maximum Valid Dilution (MVD) for that product. The MVD is a function of the endotoxin limit for the product. Test for Interfering Factors is required for all finished products that are parenteral or intrathecal and for non-pyrogenic medical devices. The procedure is also used to demonstrate that the test conditions are valid when used to test raw or in-process materials.
- *Release Test* — This test is used to release finished products once the Test for Interfering Factors has been performed. The test is run at the same dilution used in the Test for Interfering Factors. The Release Test is also used to release raw materials, in-process materials, and other non-finished goods.

Drug & Medical Device Testing

Product Testing

Testing for endotoxin is performed at many steps in the manufacture of drugs and medical devices. Endotoxin testing is required for the release of finished product (see Test for Interfering Factors of End-Product Tests and Release Testing). Testing for endotoxins is also frequently performed to assess raw materials, in-process materials, vendors, as well as for projects and components in research and development. Endotoxin testing is often a component of investigations into product quality issues.

CTS works with clients to perform testing rapidly and assists customers' quality departments in identifying endotoxin sources and troubleshooting product and production issues. CTS can help with integrating endotoxin testing into the quality system at the client's facility.

Raw Materials Testing

Raw materials can be tested as part of a traditional QC program or Process Analytical Technology (PAT). Identifying the amount of endotoxin in raw materials helps highlight process modifications that can improve the final product. Matching results from raw materials and final product can yield the contribution of each raw material to the endotoxin content of the final product and facilitate improvements in quality during production. Some raw materials should have endotoxin limits established and confirmed to determine if a batch can be accepted from a vendor.

Test for Interfering Factors of End-Product Tests

Production lots of the final product should be subject to the Test for Interfering Factors before the test may be used to release final product. The assay is also used in QC programs to accept raw materials into production. Testing can be performed in accordance with USP, EP, and/or JP, depending on the specifications of the client.

Release Testing

The Release Test is performed according to the assay conditions and dilutions used during the Test for Interfering Factors and is used to release finished product. The test can also be performed for release of raw or in-process materials. Release testing can be performed in accordance with USP, EP, and/or JP, depending on the specifications of the client.

Sending Samples

A Sample Submission Form (SSF) must be completed and accompany each sample sent for testing. Sample Submission Forms can be obtained from our website at acciusa.com/products-and-services/contract-test-services or by calling CTS (US office 888.232.5889 or UK office 44.151.547.7444).

Custom Services

CTS offers a variety of services that are customized to meet each client's individual requirements.

Method Development

Some samples or devices interfere with the BET tests and a method must be developed in order to be able to perform a valid test for endotoxin. CTS will determine how best to prepare the sample for testing. We can also perform testing to validate any sample pre-treatment used in the test method.

Method Transfer

Many companies have sufficient testing volume to justify performing the assay in-house. For these customers, ACC supplies a complete line of the highest quality BET reagents. CTS works with companies to develop and optimize methods to test their products using this line. CTS also helps customers convert from one methodology to another (e.g., from testing by the gel-clot method to chromogenic or turbidimetric assays). The methods developed by CTS are then transferred to the client for use by their own QC laboratories, giving them the assurance that the method will work well with their products.

Custom Depyrogenation Controls

CTS will make custom depyrogenation controls using the same items normally processed in your oven and provide a Certificate of Analysis for the articles. The controls are then used to demonstrate at least a three-log reduction by your oven cycle. CTS can also test items post-depyrogenation to verify your oven cycle performance.

Contact Information

For information on services provided and laboratory qualifications, please contact your local office.

US Office

Contract Test Services at ACC
124 Bernard E. Saint Jean Drive
Falmouth, MA 02536-4445

t 888.232.5889 or 508.540.3444
e testservice@acciusa.com

Hours of Operation:
Monday through Friday, 8:00 a.m. to 5:00 p.m. EST

European Office

Unit 1 F/G/H Academy Business Park
Lees Road, Knowsley
Liverpool L33 7SA

t (44) 151.547.7444
e customerservices@acciuk.co.uk

Hours of Operation:
Monday through Friday, 9:00 a.m. to 5:00 p.m.

Contract Test Services Offered

Product Screening/Characterization

Kinetic Turbidimetric Assay	
TSAM	Standard Turnaround Time
TSAM-R	Rush Turnaround Time
TSAM-S	STAT Turnaround Time
Endotoxin-Specific Kinetic Turbidimetric Assay (Glucan Blocking)	
ESTURB	Standard Turnaround Time
ESTURB-R	Rush Turnaround Time
ESTURB-S	STAT Turnaround Time
Repeat Assay, as Needed	
TREP	Standard Turnaround Time
TREP-R	Rush Turnaround Time
TREP-S	STAT Turnaround Time
Kinetic Chromogenic Assay	
CSAM	Standard Turnaround Time
CSAM-R	Rush Turnaround Time
CSAM-S	STAT Turnaround Time
Endotoxin-Specific Kinetic Chromogenic Assay (Glucan Blocking)	
ESCHRM	Standard Turnaround Time
ESCHRM-R	Rush Turnaround Time
ESCHRM-S	STAT Turnaround Time
Repeat Assay, as Needed	
CREP	Standard Turnaround Time
CREP-R	Rush Turnaround Time
CREP-S	STAT Turnaround Time
Gel Clot Assay	
GSAM	Standard Turnaround Time
GSAM-R	Rush Turnaround Time
GSAM-S	STAT Turnaround Time
Endotoxin-Specific Gel Assay (Glucan Blocking)	
ESGEL	Standard Turnaround Time
ESGEL-R	Rush Turnaround Time
ESGEL-S	STAT Turnaround Time
Repeat Assay, as Needed	
GREP	Standard Turnaround Time
GREP-R	Rush Turnaround Time
GREP-S	STAT Turnaround Time
Glucatell® - Assay to Determine Interference from (1→3)-β-D-Glucan	
GLUC	Standard Turnaround Time
GLUC-R	Rush Turnaround Time
GLUC-S	STAT Turnaround Time
Glucatell® Re-test, as Needed	
GLUR	Standard Turnaround Time
GLUR-R	Rush Turnaround Time
GLUR-S	STAT Turnaround Time

USP/EP Inhibition/Enhancement (Validation) Test

Preliminary Screening (Characterization) of samples must be done prior to Inhibition/Enhancement (validation) testing.

Kinetic Turbidimetric Assay	
TVAL	Standard Turnaround Time
TVAL-R	Rush Turnaround Time
TVAL-S	STAT Turnaround Time
Endotoxin-Specific Kinetic Turbidimetric Assay (Glucan Blocking)	
ETVAL	Standard Turnaround Time
ETVAL-R	Rush Turnaround Time
ETVAL-S	STAT Turnaround Time
Kinetic Chromogenic Assay	
CVAL	Standard Turnaround Time
CVAL-R	Rush Turnaround Time
CVAL-S	STAT Turnaround Time
Endotoxin-Specific Kinetic Chromogenic Assay (Glucan Blocking)	
ECVAL	Standard Turnaround Time
ECVAL-R	Rush Turnaround Time
ECVAL-S	STAT Turnaround Time
Gel-Clot Assay	
GVAL	Standard Turnaround Time
GVAL-R	Rush Turnaround Time
GVAL-S	STAT Turnaround Time
Endotoxin-Specific Gel-Clot Assay (Glucan Blocking)	
EGVAL	Standard Turnaround Time
EGVAL-R	Rush Turnaround Time
EGVAL-S	STAT Turnaround Time

USP/EP Limit/Release Assay

Inhibition/Enhancement (Validation) of product must be done prior to Release/Limit testing.

Kinetic Turbidimetric Assay	
TREL	Standard Turnaround Time
TREL-R	Rush Turnaround Time
TREL-S	STAT Turnaround Time
Endotoxin-Specific Turbidimetric Assay	
ETREL	Standard Turnaround Time
ETREL-R	Rush Turnaround Time
ETREL-S	STAT Turnaround Time
Kinetic Chromogenic Assay	
CREL	Standard Turnaround Time
CREL-R	Rush Turnaround Time
CREL-S	STAT Turnaround Time
Endotoxin-Specific Kinetic Chromogenic Assay (Glucan Blocking)	
ECREL	Standard Turnaround Time
ECREL-R	Rush Turnaround Time
ECREL-S	STAT Turnaround Time

Gel-Clot Assay	
GREL	Standard Turnaround Time
GREL-R	Rush Turnaround Time
GREL-S	STAT Turnaround Time
Endotoxin-Specific Gel-Clot Assay (Glucan Blocking)	
EGREL	Standard Turnaround Time
EGREL-R	Rush Turnaround Time
EGREL-S	STAT Turnaround Time

PyroSmart NextGen® Recombinant Cascade Reagent (rCR)*

PSNGPS	Preliminary Screening/Verification
PSNGIE	Inhibition/Enhancement
PSNGLT	Limit/Release

*The suitability of PSNG must be verified for use in testing specific products or materials. This verification must include specific experiments to confirm that the method is suitable for its intended purpose under the conditions of use for the material, drug substance, and/or drug product.

Customer Services	
COVN	Oven Depyrogenation Validation
CMTN	Methods Transfer (in-lab technician training)
CTQN	Technician Qualification (in-lab, one-on-one training)
CSOP	SOP Writing of Developed Method
Additional Services	
RTRND	Special Shipping (samples sent back to client or to alternate location)
OTHER	Report Rush
Labor - Additional Sample Preparation/Extraction/Unusual Treatment/Handling	
PREP	Standard Turnaround Time
PREP-R	Rush Turnaround Time
PREP-S	STAT Turnaround Time

ORDERING INFORMATION

Customer service representatives are available to assist you with orders, pricing requests, and Certificates of Analysis.

METHOD OF PAYMENT FOR UNITED STATES

- *Check* (in US dollars) made payable to Associates of Cape Cod, Inc.
- *Wire Transfer* (contact Accounts Receivable for routing information)
- *Credit Card* (AMEX®, VISA®, MasterCard®)
  If payment is to be made by credit card, the following information is required:
  - » *Type of Credit Card*
  - » *Card Number*
  - » *Credit Card Security Code*
  - » *Expiration Date of Card*
  - » *Name (as it appears on the card)*

ADDITIONAL INFORMATION

ACC reserves the right to institute, modify, or discontinue credit limits provided to customers at any time for any or no reason.

The use of credit cards for payment may incur a fee; please see our website for ACC's policy on credit card usage.

OUTSIDE THE US

Please contact your local office for information regarding method of payment. For a list of your country-specific distributors, please visit acciusa.com.

Product listings, information, and fill sizes are subject to change at any time without prior notice.

ALL PRODUCTS AND SERVICES LISTED HEREIN

are offered exclusively under ACC's Terms and Conditions of Sale, which can be found online.

PROTECTION THROUGH DETECTION

CORPORATE HEADQUARTERS

Associates of Cape Cod, Inc.
124 Bernard E. Saint Jean Drive
Falmouth, MA 02536-4445
USA

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f 508.540.8680

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