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MICROBIAL SOLUTIONS

Case Study: Transitioning from Gel-Clot to Endosafe® LAL Cartridge Technology for Bacterial Endotoxin Testing

Overview/Abstract

The gel-clot assay is still recognized by some countries around the globe as the method of choice for the bacterial endotoxin test (BET) because it's relatively inexpensive and easy to source. Some countries reference this method as the gold standard, which is represented in cases of regulatory doubt in Pharmacopeia BET monographs.

As the industry increases its focus on data integrity, utilizing the antiquated, labor-intensive, and error-prone qualitative gel-clot technique poses a risk to quality data management processes. Quantitative methods that are rapid, reliable, and flexible are being implemented across the industry.

Situation/Challenge

When a global healthcare company that specializes in lifesaving medicines and technologies for infusions and transfusions was looking internally at their processes during a routine quality risk management assessment, the manual gel-clot method was highlighted as a risk to ongoing compliance, and a process to investigate rapid, quantitative, and automated systems was established. Improving compliance was the main driver, but other tangible benefits to switching methods were also investigated. "We wanted to improve our compliance level and identified that moving from the manual gel-clot method to an automated method would allow us to do this," said Ganesh, the company's Microbiology Head Laboratory Manager. The additional benefits identified after the investigation included elevated data integrity compliance, simplicity of method and training requirements, speed to result, time savings, and manpower redeployment.

Solution

The organization evaluated the Endosafe® LAL cartridge technology utilizing the nexgen-MCS™, a multi-cartridge endotoxin testing system, and Endosafe® EndoScan-V™ software. They discovered that cartridge technology greatly enhanced data integrity compliance for their operations. Moving away from a manual, subjective test method to one with far fewer manual steps, automated reading and report generation, and a fully searchable audit trail was the key to their compliance improvement. Fewer manual steps reduced the risk of human error, a leading cause of compliance failures.

Automated reading and report generation removed the need for subjective analysis and potential misreporting of results, reducing the risk of releasing harmful products into the supply chain. With a fully searchable audit trail, traceability and oversight of actions taken are possible in a secure, attributable, and timestamped format, compliant with current data integrity guidelines. Implementation of cartridge technology will allow the organization to significantly elevate their compliance position, aligning with their priorities and eliminating the risks to their business as identified in their quality risk management audit.

The organization found cartridge technology requires minimal user interaction for assay set up and execution. The simplicity of cartridge technology is one of its key benefits, vastly reducing the training required to qualify technicians to use the system. This allows for more technicians to be trained in a much shorter timeframe expanding the pool of trained technicians available at any time to perform the test. This proved to be very useful as new technicians could be trained on the system in a matter of hours. "Microbiologists always have the potential to make

mistakes when performing the gel-clot assay, especially when being watched by auditors," Dr. Ganesh stated. "The simplicity of the cartridge technology greatly reduces the potential for mistakes, which is great for us and pleases auditors too."

In addition to the simplicity of training, cartridge technology also offers a much-reduced time to result, when compared to gel-clotting. Set up time is minimal and test time is also reduced, from 60 minutes down to about 15 minutes. The overall reduction in time to result delivered the additional benefit of allowing for the redeployment of two staff members to other tasks within the department, eliminating the need for recruiting new employees for these positions and therefore avoiding the additional cost this would have incurred. "It used to take us 2–3 hours to test 10 samples with the gel-clot method. Now, with cartridge technology, we can test more sample in less time," said Dr Ganesh.

On top of this, the remaining BET technicians were also freed up to carry out other tests in the busy micro lab, thus significantly increasing the efficiency of the lab while reducing manpower costs, as Dr. Ganesh explains: "We are a multi-discipline lab, performing many different tests per day. The time saved by using cartridge technology means we have more time to complete our other testing requirements, which is a great benefit and saves the lab money."

Results

After a full evaluation, including in-house testing of the system, the Endosafe® LAL cartridge technology was identified as the most suitable method to replace their existing gel-clot method based on the aforementioned drivers. "I've been using Charles River products since 2004 and always had great support from them," said Dr. Ganesh. "If ever we had a question or issue, they were always the first people I called and constantly provided excellent technical support to us. Knowing that this support would continue was a very important consideration for choosing this system."

The business case placed before management highlighted the risks identified of remaining with the status quo, while detailing the advantages of moving to cartridge technology. Management had already identified the micro lab as a department heavily reliant on manual processes and were keen to implement efficiencies where possible. The fact that Charles River Laboratories was already a valued partner was also a consideration for management, as this alleviated any concerns attached to switching from their tried and tested method to a new and unfamiliar system.

The business case was duly approved, and implementation was then scheduled. "Management were ready for automation and a simplification of our processes," said Dr Ganesh. "When the benefits of such a switch were presented to them, they encouraged us to move forward with it."

Implementation

Local technical support staff were responsible for the installation and qualification of the new system, and further assisted with the process of product validation to assist with a timely implementation. Continued support has been delivered as needed, as additional products are migrated over to the cartridge method. "Charles River has been on hand to assist with our product validation, supervising the process as we perform the testing," Dr. Ganesh remarked. "We have about 25 products to validate and, with their help, this should be complete in about 2–3 months."

Conclusion

Following a quality risk assessment that identified gaps in compliance with their gel-clot BET method, the organization embarked on a mission to improve compliance, simplify their endotoxin testing, and improve lab efficiency. Cartridge technology enabled them to deliver on all their drivers for change, as well as delivering benefits they had not foreseen.

Vendor support was key to a successful and timely implementation, which has immediately increased lab efficiency, allowing them to test more samples in less time with fewer resources. Delivering on their business case was a key requirement for management, and they have been able to do this effectively and without disruption, to the satisfaction of all involved. Dr. Ganesh concluded that they are "very happy with the way things have gone" and thanks Charles River for their continued support throughout the process and beyond.