Avantor Services

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Equipment Management

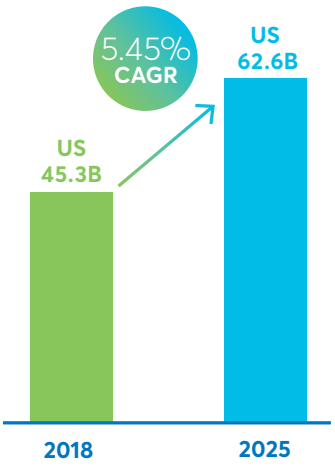
Maximizing laboratory performance and value through comprehensive equipment management

WHITE PAPER

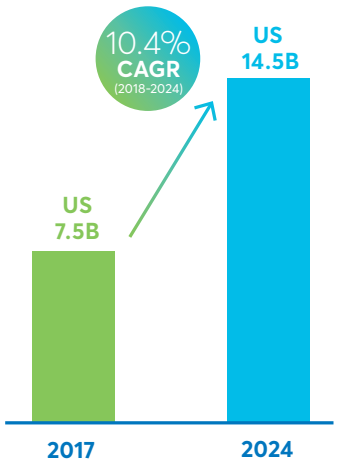
From pipettes to centrifuges to freezers, reliable equipment is a fundamental element for success in laboratories across the globe. Each day that a lab manager, research scientist, senior lab technician or other science professional walks into their facility, they need to trust that the tools and instruments they use are compliant and will perform as expected.

Reliance on quality equipment is reflected in the global growth in laboratory equipment sales and related services. For example, in 2018, one market study valued the global laboratory equipment market at US$45.3 billion and projected that it's expected to grow to US$62.6 billion by 2025, a 5.45% CAGR.[1] Lab equipment services are expected to grow at an even higher pace; one study projects that the global market is expected to generate revenue of around US$14.7 billion by the end of 2024, growing at a CAGR of approximately 10.4% between 2018 and 2024.[2]

Global Lab Equipment Market



Global Lab Equipment Services



As the utilization of devices grows, so does the need for organizations to protect these assets by ensuring they are properly maintained and calibrated, as well as compliant. Biopharmaceutical companies increasingly look for additional lab and resource space while reducing device duplication. This need is especially apparent in next-generation research facilities that operate using a lean, flexible model that supports discovery and research by collaboration. These facilities stock less equipment to ensure optimal usage of space — a model that increases pressure on lab managers to ensure equipment is reliable.

Contracting with an external service provider can provide a potent management tool. The 2019 Lab Manager Purchasing Trends survey suggests that laboratories are outsourcing key functions; approximately 65% of those surveyed reported outsourcing lab activities and among those, quality and assurance testing was the second most outsourced activity, behind information technology.[3]

Given the critical role of equipment, many laboratories are considering the value of life-cycle equipment management services, either with an end-to-end solution or one that provides a specific service that maximizes the organization's resources.

LABORATORY EQUIPMENT: EVERY DEVICE MATTERS

Equipment, including instruments and devices, are critical components in a broad range of laboratories including those focused on biopharmaceuticals and life sciences, like corporate, university and government establishments, as well as clinical settings associated with hospitals and healthcare facilities. Labs in industries with structured quality control, such as food and beverage, cosmetics, chemical and environmental, also rely on standardized equipment.

Science professionals need to trust — every day — that their equipment, from centrifuges and pipettes to scales and freezers, is accurate and reliable. Unreliable tools skew results, rendering them un-replicable.

Equipment failure directly impacts quality control and research results — even when the equipment is considered basic. For example, the qPCR process relies on accurate pipetting to help produce precise calculations. Pipetting inaccuracy of as little as 5% can result in a 2 nanograms-per-milliliter variation in template DNA; such an error is geometrically amplified throughout the reaction and leads to hard-to-interpret results.[4]

Inadequate or improper calibration or maintenance can trigger substantial negative impacts for the organization, from increased costs to unnecessary experiment repetition. It can also result in the inability of organizations to efficiently plan for and incorporate equipment availability into research workflows.

An organization gains advantages by proactively and properly managing and maintaining Category 1 equipment, a group that encompasses basic laboratory equipment. It creates opportunities for:

- Smoother operations
- Better scheduling of research workflows
- More efficient and productive use of equipment
- Assurance of regulatory compliance
- Full insight into equipment needs across the organization

The overall result is that proper equipment management creates a laboratory in which scientists can walk into the lab and get to the heart of their work immediately, without spending time on instrument or device set-up, cleaning, maintenance or tracking.

Specialized management solutions, whether they encompass HR or information technology, can be powerful tools to streamline laboratory operations and yield better scientific results. Full life-cycle equipment management solutions can offer those same benefits. To understand those benefits, it's important to more fully appreciate the challenges and issues laboratory professionals face.

KEY CHALLENGES AND ISSUES ASSOCIATED WITH LABORATORY EQUIPMENT

Inventory — equipment is everywhere and nowhere

Growth across all industries has often resulted in non-coordinated, localized purchasing. The selection and purchase of equipment is a process frequently driven by scientists who make choices defined by the unique needs of their research.

Managing that inventory in the lab setting is about far more than just asset management; it involves a strategic approach to equipment that begins with purchase and installation and ends with replacement and decommissioning. The life cycle in between includes everything from warranty repair to routine calibration to regular maintenance.

Labs may not have a structured solution that completely accounts for the full equipment life cycle. This insufficient approach can lead to a host of issues, including unexpected or prolonged downtime that delays research as well as noncompliant documentation. In some cases, a lab might own the necessary equipment but be unable to locate it because of poor tracking, which in turn increases incremental spend on new purchases to replace the lost instrument or device.

Diversity of manufacturers and suppliers

Adding to the complexity of life-cycle equipment management is the diversity of lab supplies sources. Laboratory managers and scientists have an extensive range of choices for Category 1 products, which are manufactured and distributed by thousands of suppliers.

That complexity of choice is magnified as a laboratory may stock many different types of basic equipment and supplies scattered across dozens of different providers or brands. For example, a single lab might use multiple versions of the same device, like an electronic scale or incubator, and that device might be supplied by as many as three or more manufacturers — all with different processes for documenting verification as well as different service contracts, warranties and policies for calibration processes.

It's essential for labs managing their own equipment to use in-house personnel trained on maintaining devices and performing in-house calibrations from multiple suppliers, a process that can be highly time-consuming and quite difficult or virtually impossible to properly schedule.

Ensuring compliance

The management and documentation of basic laboratory equipment calibration can be complex and fragmented. Yet calibration is necessary for reliable research results.

The compliance component of lab management is particularly a risk for organizations doing work subject to regulations, like pharmaceutical companies developing medications or labs researching cell and gene therapies. Organizations conducting this type of work are required to create auditable records that demonstrate compliance with internal and external rules. It's essential that these laboratories routinely calibrate equipment and instruments as well as properly document the process to ensure results are compliant, accurate and repeatable.

To that end, the lab must ensure its document validation process is in order as soon as equipment is delivered. Successful equipment management must also include a process that documents, plans and schedules regular calibration in accordance with regulations and/or supplier guidelines.

For a range of products, calibration must be performed by trained and accredited technicians. Many lab operations continue to perform calibrations conducted by their own staff, which presents multiple risks if those staff members aren't properly trained. In addition, internal staff members may not be aware of proper documentation for calibration methods.

CALIBRATION IN ACTION

Increasing compliance requirements make proper pipette calibrations essential for research organizations. Our EU ISO 17025 accredited competence center found that for every 100,000 pipettes calibrated, about 30% test outside the manufacturer's specifications, while an additional 10% are in need of repair. However, conducting preventative maintenance at least annually decreases the number of out-of-spec pipettes; furthermore, those that fall outside recommended parameters typically need significantly lower levels of adjustment.

Maintaining and servicing equipment

Like calibration and compliance, laboratories must consider equipment and instrument maintenance and service as part of a full life-cycle management solution. One key consideration is that any maintenance must be conducted in accordance with manufacturers' recommendations. Organizations also need to consider whether the equipment is under warranty as well as who is responsible for managing that warranty.

Service providers are equipped to maintain a wide range of models across different industries. Yet not all equipment maintenance and repair providers offer a full range of services. Some cover just equipment repair and maintenance; others provide a more robust range of offerings that might include calibration services as well.

The location in which those services are performed is another factor to consider when working with equipment service providers. Some solutions provide complete onsite services performed by the provider's trained personnel, which takes the onus off of the laboratory for recruitment, hiring and training of in-house service staff. In other cases, service and maintenance are outsourced to dedicated third-party providers working strictly off-site, requiring lab personnel to schedule and coordinate maintenance.

Coordination can be complex, particularly for operations with multiple labs across numerous countries or regions, as it's necessary to establish uniform maintenance practices that meet the organization's internal quality standards as well as those of each local jurisdiction.

The implementation of asset management tools can streamline the service and maintenance process. Some labs approach the challenge by treating equipment as an asset management issue. They might purchase asset management software and add it to their organization's information management systems platforms.

However, asset management is only part of the challenge. At its root, successful life-cycle equipment management requires the integration of tools, personnel and processes. Only when these three components come together can a lab fully manage all equipment assets to deliver the greatest value — and that often entails a solution that goes beyond a software program.

SUCCESS STORY

CHALLENGE

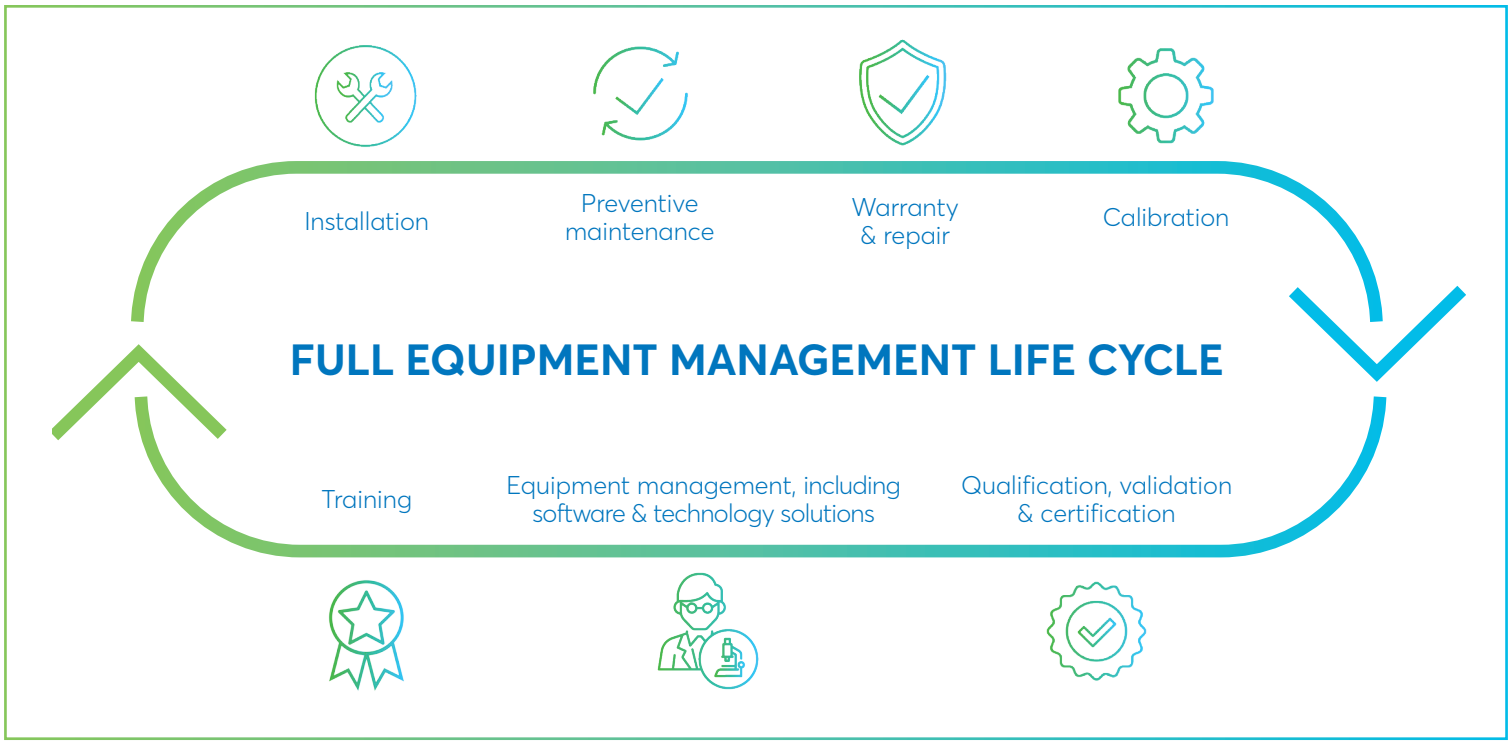
A global pharma company found that lab equipment inventory was inaccurate, resulting in lost time, competing priorities and operational decisions.

SOLUTION

Avantor® Services (formerly known as VWRCATALYST) championed a partner and provided Laboratory and Instrument Management Inventory services to key campuses across the United States.

RESULT

Inventory data accuracy within the customer equipment management system was 76.4% and improved to 96.31% accuracy within the proprietary system. Customer equipment management systems were updated. Rolling inventories were implemented with a goal of 95% completion. Avantor Services teams, quarter after quarter, completed an average >97% to contribute to accurate equipment management systems data.



SOLUTION: FULL LIFE-CYCLE EQUIPMENT MANAGEMENT

An ideal solutions provider would offer comprehensive services that consider all aspects of equipment management, including:

- Installation and validation of new equipment
- Complete standardized and customized calibration services — using either on-site or third-party resources
- Preventative maintenance and repair services
- Warranty management
- Business process consulting to fully integrate and optimize how these services best serve each laboratory's needs
- On-site support option to facilitate client equipment information services as well as service call and vendor management

Ideally, an equipment management solution would serve as a one-stop shop, offering a complete scope of services, including the ability to place expert personnel on-site to ensure all the facility's equipment needs are met. In addition, any one-stop solution provider must offer the flexibility and scalability that today's laboratories need for success.

When considering external equipment management, it's also necessary to choose a provider that protects the lab from risk factors related to noncompliance and regulatory issues, particularly for organizations working within or serving more than one jurisdiction. This entails the need for deep regulatory knowledge that crosses country boundaries as well as assurances of regionally compliant management, documentation and validation of calibration and repair issues. The right life-cycle equipment solutions provider also has management tools, including easy-to-use online service portals integrated into their capabilities.

Organizations experience advantages when working with an equipment management solutions supplier able to simultaneously offer expertise in other areas as well. For example, the ideal provider will have developed close working relationships with

major manufacturers across broad segments of Category 1 products. In-depth experience managing multi-vendor operations is critical for success, too, as well as having established processes and programs for on-site tasks such as inventory management. Labs also gain an advantage from choosing a supplier experienced in logistics, scheduling, planning, procurement and customer service/support.

An additional consideration for full life-cycle management is the ability of a provider to empower labs to implement Connected Lab technologies. This establishes a forward-looking management environment and maximizes the value of laboratory technology and data with devices.

For example, the Connected Lab offers the advantage of providing a range of devices — even those considered as basic laboratory equipment — that can be standardized with data formats and connections to work with all devices, laboratory management systems, equipment management service providers, equipment suppliers and eCommerce portals.

Organizations that implement a Connected Lab concept can also enable improvements in full life-cycle equipment management, from the automation of installation and inventory management steps to workflow management, cost management and scheduling/availability issues. Connectedness also allows for advantages like automatic consumables replenishment or data that indicates a device needs maintenance before it fails.

Full life-cycle equipment management is the most effective way to:

- Maximize the value and availability of qualified lab equipment
- Make sense of lower-cost Category 1 equipment, not just high-cost Category 3 systems
- Ensure that crucial compliance and calibration issues are fully and reliably addressed on a routine basis
- Create an effective framework that provides properly trained and scheduled maintenance and repair resources and processes to keep all equipment running properly
- Protects lab operations — particularly scientists and lab techs — from the need to engage in complex and time-consuming equipment management tasks

From purchasing to replenishment to replacement, dynamic and strategic life-cycle equipment management solutions are crucial components that empower scientists to focus on what they do best, from discovery to delivery.

1. Market Study Report LLC, 2019-2025 Global Laboratory Equipment Market Report, accessed on August 15, 2019, https://www.marketwatch.com/press-release/laboratory-equipment-market-size-is-anticipated-to-reach-us-62600-million-by-2025-2019-03-26
2 Zion Market Research, Global Laboratory Equipment Services Market Press Release, accessed on August 15, 2019, https://www.zionmarketresearch.com/report/laboratory-equipment-services-market
3. Lab Manager, 2019 Lab Purchasing Trends Survey, accessed on August 15, 2019, https://www.labmanager.com/business-management/2019/05/2019-lab-purchasing-trends-survey#.XVVlt5NKjOS
4. Paul, Catriona. How to Check the Accuracy of Your Pipette, accessed on August 15, 2019, https://bitesizebio.com/21218/how-to-check-the-accuracy-of-your-pipette/

1219 Lit. No. 930969W ZPROVWR23194-EN