

New, Innovative Technology Addresses Manufacturing Operational Challenges

Hydraulic tank scale calibration reduces downtime and water consumption and improves productivity



METTLER TOLEDO



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New, Innovative Technology Addresses Manufacturing Operational Challenges

By **METTLER TOLEDO**

Calibrating production and storage tanks is essential to determine the exact material quantities and minimize measurement uncertainty. Additionally, calibration can discover errors and controls uncertainties within measurement processes to maintain acceptable industry-standard levels. There are six major methods used to calibrate tank scales: calibration with test weights, weightless calibration, material substitution, material transfer, flow meter and hydraulic calibration.

When determining what tank scale calibration method to use, manufacturers must consider some important issues: Does it meet quality and industry standards? Are the processes traceable? Does it improve safety, reduce downtime and lessen resource waste?

Understanding these considerations and determining an effective calibration method will improve operations and ensure industry regulations are being met.





Meeting Industry Standards

Many companies follow Good Manufacturing Practices (GMP) and ISO9001 to ensure high quality. ISO 9001:2018 [6] section 7.6 states: "Where necessary to ensure valid results, measuring equipment shall a) be calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international standards or national measurement standards." Tank scales are measuring devices used in production to ensure quality under these standards.

ISO 9001 is the international standard for quality measurement systems and is the only certifiable standard. Manufacturers adhering to ISO 9001 ensure that production is consistent. Along with this standard is ISO/IEC 17025 Accreditation, which is another benchmark that enables laboratories to demonstrate they operate according to industry regulations and generate valid results.

Innovative Hydraulic Tank Scale Calibration

RapidCal™ is a hydraulic method complying with the ISO 17025 standard that METTLER TOLEDO deploys via accredited service teams in the USA, Canada, Mexico, and more recently Malaysia, Germany and Austria, with more countries pending. On completion of the calibration process, a globally recognized calibration certificate is issued that adheres to the most important international standards.

RapidCal™ Benefits

- Increased Uptime

Simply hook up the portable hydraulic system and run the calibration procedure.

- Reduced Costs

No purified water or test weights are required.

- Reduced Contamination Risks

Hydraulic system applied to the outside of the tank eliminates the risk of contamination.

- Ultimate Accuracy

Traceable built-in reference load cells allow the RapidCal™ to be accurate within 0.1% of full-scale calibration.

Find out more: www.mt.com/IND-RapidCal



Reducing Downtime Costs

All manufacturers experience downtime, typically in the range of 5 to 20%. The costs associated with these are staggering, particularly for the pharmaceutical industry, ranging between \$100,000 and \$500,000 per hour of downtime.¹ Reducing the frequency of outages, minimizing the length of the disruptions, and accelerating the restoration of production post-incident lowers the cost and impact on overall employee and plant productivity.²

Digitizing, automating and integrating additional technology to reduce downtime and for quality controls allows pharmaceutical manufacturers to be more productive and efficient. By optimizing testing and automating processes, manufacturers can boost productivity between 50 to 100%.³ Digitization

and automation can also ensure better quality compliance by reducing manual errors and variability, which can cost manufacturers millions in fines by regulatory agencies.

In addition to unplanned downtime, plants also experience production line stoppages when they perform mandatory tank scale calibration. Traditionally, the calibration process involves emptying, cleaning and drying the tanks, and then pumping in thousands of liters of purified water monitored by a flow meter; a process that can take one day to three weeks to complete — all while production is halted.

As well as lost revenue, there is a high sustainability and social price to pay for water purification and treatment and disposal of the water.



¹ <https://www.netscout.com/blog/beating-high-cost-manufacturing-downtime> (accessed July 19, 2023).

² Ibid

³ <https://www.mckinsey.com/industries/life-sciences/our-insights/digitization-automation-and-online-testing-embracing-smart-quality-control> (accessed July 19, 2023)



Sustainability Challenges

Like other industries, pharmaceutical companies face ESG challenges around reducing waste and cutting carbon emissions and greenhouse gas pollution. An analysis by PWC concluded that key environmental issues include high energy consumption and environmental pollution in connection with the production of pharmaceutical products.⁴

To meet mandatory compliance testing regulations, companies may implement the traditional method of flowmeter calibration. This involves energy to purify the water, pumping thousands of liters of water into each tank, testing multiple tanks over numerous weeks, and removing this water from these tanks following the calibration. Removal includes transportation and fuel costs. Additionally, working in pharmaceuticals presents the possibility that the water may get slightly

contaminated and require remediation efforts. Should these fail, then hazardous material disposal efforts are needed that require time, energy, extra cost and extra documentation for the authorities.

Water restrictions due to droughts add another layer of challenges. If limits are imposed on industrial water usage, then the calibration needs to be scheduled to coincide with when water may be available.

Fortunately, new, innovative technology provides companies the opportunity to be better environmental stewards and lower their energy and water consumption, particularly in regard to tank scale calibration. This technology also addresses worker safety concerns and reduces downtime.

Choose the right calibration method for your tank scale

This white paper presents the pros and cons of six calibration methods for tank scales, while also considering different requirements for accuracy and compliance.

[Choose the right calibration method for your tank scale - METTLER TOLEDO \(mt.com\)](#)

⁴ <https://www.pwc.de/en/sustainability/sustainability-in-the-pharmaceuticals-and-life-sciences-industry.html> (accessed July 20, 2023).



Advanced Technology Calibration

Regular calibration is commonplace for process manufacturers. However, this is even more critical in the pharmaceutical industry where instrument accuracy is essential to product quality and safety. This ensures compliance and minimizes costs associated with products that are out of specification, reducing potential fines and product recalls. Calibration helps ensure that measuring instruments and devices used in production are accurate, precise, and compliant with industry regulations and standards. While most instruments are highly accurate, regulatory bodies like the European Medicines Agency (EMA), the Food and Drug Administration (FDA), and the International Organization for Standards (ISO) still need to know the exact extent of an instrument's inaccuracies, measured against specified tolerance levels.

Typically, calibration means a lot of downtime — sometimes as much as three weeks at the cost of millions of dollars in lost revenue. In contrast, utilizing an external hydraulic calibration service dramatically reduces time, up to three times faster than traditional flow meter calibration, costs and contamination risks while achieving 0.1% accuracy.

This calibration method — for both small and high-tank capacities up to 32 tons — is done by applying hydraulic force that is monitored by accurate reference load cells. This calibration method process pulls down on the tank scale to emulate normal weighing, thereby automatically accounting for piping effects. The values from the terminal are input into a calibration algorithm that quantifies the measurement uncertainty so it can be

compared against the production reference tolerances to arrive at an indication of fit for purpose. Therefore, by using hydraulic calibration, expensive and risky material substitution with purified water is avoided, the chance of tank interior contamination is eliminated, and the environmental impact is reduced from the creation and disposal of calibration water.





Moving Forward

Pharmaceutical manufacturers face myriad challenges brought on by changing demographics, regulatory agencies and ESG expectations. Fortunately, innovative external hydraulic tank scale calibration allows companies to move beyond traditional calibration methods that are expensive, time-consuming, environmentally wasteful, and risky. Forward-thinking companies that adopt new technology help reduce downtime and improve quality control to meet regulatory calibration requirements.

Benefits of ISO 9001 certification for weighing devices

ISO 9001 certifications can provide numerous benefits to manufacturers:

- Defining a company's quality control process, which will provide metrics to help improve growth and profitability;
- Enforcing a continuous improvement strategy so manufacturers will seek ways to reduce waste and improve efficiency;
- Enhancing the customer experience because producing a product in a way that reduces waste and costs brings more value to customers.

In relation to weighing and calibration, manufacturers must ensure that every balance or scale used in the weighing process is accurate. Weighing is critical to product quality and directly related to the accuracy of weighing results, which is determined through calibration. [Download this METTLER TOLEDO white paper for more information.](#)



METTLER TOLEDO provides automation weighing sensors and scales for nearly all industrial applications and industries. The company specializes in precision weighing devices, including scales and weighing component combinations ranging from a microgram to thousands of tons. Solutions range from industrial weigh modules and load cells to PLC connectivity devices that easily integrate weight into your processes.

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