

Time to Get Level with Your Lab Balance or Analytical Lab Weighing

June 17, 2025 | Editorial Article

Introduction

Analytical weighing plays a crucial role in daily laboratory practices. In basic research, it usually serves as the first step in preparing buffers, media, and reagents. In regulated workflows, weighing is essential for compliance, quality control, and process accuracy, supporting critical measurements such as quantitative analysis, formulation, production monitoring, and calibration to ensure reliable results in pharmaceuticals and biotechnology.

Advanced weighing technologies incorporate complicated internal systems to produce accurate results, as many factors can impact a reading. Environmental factors like temperature, airflow, and static effects can prolong measurement stabilization times. It also requires routine calibration and cleaning, which are vital to maintaining balance performance over time. This article focuses on another factor: leveling the balance.

Here, we will discuss why balance leveling is important, how it is performed, and how balances with automated leveling systems can make a significant difference.

SARTORIUS



Automatic leveling

Please start automatic leveling.



START



Why is Leveling Important?

A balance must be perfectly horizontally aligned (leveled) to align its weighing axis with the gravitational field. Any tilt causes the weight vector to deviate, leading to measurement errors. Even slight angular deviations can result in significant inaccuracies; for instance, a tilt of just 0.1 degrees can cause errors of 2 mg in a 100 g measurement.

Proper leveling ensures consistent weight distribution on the weighing pan, improving repeatability and stabilizing the balance, thus reducing susceptibility to vibrations or disturbances. Moreover, leveling is often a prerequisite for calibration; without it, calibration adjustments may be inaccurate, compromising subsequent measurements. In industries like pharmaceuticals, regulatory compliance with standards such as ISO 17025 mandates proper leveling for traceable and consistent results.

Factors Affecting the Leveling of a Balance

Several factors can impact the leveling of a balance. Environmental influences such as vibrations, temperature fluctuations, and surface irregularities can affect leveling. The setup and condition of the balance itself also play a role. That's why it is important to place the balance on a stable, vibration-free surface, or use an anti-vibration table for added stability. Additionally, if the balance is moved or disturbed, the leveling process should be repeated for proper alignment.

How and How Often is Leveling Performed?

Leveling can be performed manually or automatically. Manual leveling involves checking the integrated leveling bubble, adjusting the leveling feet, and verifying stability. This process can be time-consuming and prone to errors, especially when balances are frequently moved. Balances with automatic motorized leveling systems are more reliable and greatly simplify this process.

The frequency of leveling a balance depends on several factors, including usage, environmental conditions, and whether the balance is moved. If the balance is relocated or shifted even slightly, it should be leveled immediately. In industries with strict standards, such as pharmaceutical labs following GMP, it is common practice to level and calibrate balances daily, or right before critical measurements.

Balances should also be checked and leveled whenever there are significant changes in temperature, humidity, or barometric pressure. Regular leveling checks may be part of standard operating procedures in labs to maintain consistent performance and avoid errors due to unnoticed shifts over time.



“The LevelControl function of Quintix® Pro guarantees a perfectly leveled balance”

Christian Weidner

Product manager Lab Weighing, Sartorius



Lab Balances with Automated Leveling Systems

Automated leveling functions are highly desirable in lab balances due to their convenience and time-saving benefits. In many cases, they are included as a suite of benefits in premium balance portfolios, such as the Cubis® II Laboratory Balances. However, the Sartorius Quintix® Pro Standard Balance series has rewritten the rules to include two auto-leveling features.

First, is the Quintix® Pro with internal LevelControl function that continuously monitors the leveling status in real time, detects deviations, and alerts the user if there is a deviation. The second feature is some models with the innovative motorized leveling feet that allow the balance to level itself automatically. In practice, this is both impressive to watch and easy to do, as it only requires the push of a button. Additionally, the internal Device-Log function records

calibration and leveling procedures, providing a traceable log with date and time stamps to support quality assurance processes.

Conclusion

Leveling is a fundamental aspect of achieving accurate and reliable measurements in laboratory settings. It minimizes errors, ensures repeatability, and complies with regulatory standards. While manual leveling can be time-consuming, automated systems like those in the Sartorius Quintix® Pro Standard Balance offer efficient solutions, enhancing precision and traceability, and supporting industry compliance protocols.

More about Quintix® Pro




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