

# How to Achieve Optimal Weighing Performance with Cubis<sup>®</sup> II High-resolution Balances





# How to Achieve Optimal Weighing Performance

Scientists in R&D or analytical laboratories need the most reliable lab weighing results. The Cubis® II platform from Sartorius provides a completely configurable, high-performance portfolio of both lab weighing hardware and software to meet the customers expectation on the highest level.

The Cubis® II modularity allows to choose from a range of 45 different weighing modules that fit your preferences. This portfolio also includes balances with very high-resolution, e.g. ultramicro, microbalances, semi-micro and analytical balances. These highly sensitive balances require a little closer inspection of their site and a slightly deeper understanding of external influences caused by the user or the environment, to achieve always the highest performance.

Very often, the application requires weighing of very small amounts of samples into large flasks or containers. The smaller the sample quantities used, the greater the relative measuring errors become, and the larger the tare container size employed, the higher the influence of environmental conditions will be on weighing accuracy. External environmental influences or improper handling can lead to inaccurate results or poor weighing performance, which are not caused by the balance.

To ensure high accuracy during weight measurements and excellent repeatability of the results you need to observe certain basic rules and requirements.

When following the instructions and recommendations below, your balance will always provide the best weighing performance and highly reliable results.



# 1 Choose a Stable Weighing Table in a Quiet Place to Set Up Your Balance.



1. The table should be solid-built and, whenever possible, be made of stone or synthetic stone.
2. Avoid causing the tabletop to sag or deflect even slightly; for example, never use it to prop up your arm.
3. Set up the balance in a vibration-free location. Ensure that there are no machines or engines that generate vibrations or electromagnetic fields near the balance. Magnetism must be ruled out (e.g., tables may not be made of stainless steel).
4. Do not position the table in the middle of the room, but near a wall or, even better, in the corner of a room, as this is where the vibration amplitudes are generally at their lowest.
5. Avoid exposing your balance to sunlight and infrared radiation emitted by lamps or heaters.
6. The location may only be slightly ventilated. Exposure to drafts needs to be avoided, and the air flow rate should be below 0.2 m/s.
7. Cold air currents from air conditioners may not pass directly across or over the draft shield, as this can result in an inversion layer of air inside the draft shield. This, in turn, can cause unstable weight readouts.

## 2 Work in the Lab under Consistently Constant Climate Conditions.



1. Avoid significant temperature changes or spikes.
2. Keep the relative humidity as constant as possible. Prevent the relative humidity from dropping below 40%, as this will significantly increase interference by static electricity.
3. Use the Cubis® II climate sensor option (temperature, barometric pressure and relative humidity) to monitor climate conditions.
4. Use the Cubis® II ionizer option to eliminate electrostatic influences. Electrostatic charges on glass vessels dissipate only very slowly, particularly when these vessels have very clean surfaces, especially when they are used freshly from a laboratory glassware washer. Electrostatic influences are easy to detect by the continuous drift of weight readouts. Increase the air humidity to levels up to 60%, and use an ionizer to reduce these effects on the resulting weight readings.

# 3 Ensure That the Balance Is Leveled and Calibrated.



1. All Cubis® II balances will support you in using the calibration | adjustment function isoCAL, and the Q-Level function implemented in the balance for leveling continuously maintains the accuracy of the weighing results within a narrow tolerance range.
2. Moreover, routinely check the balance using an external, certified weight.
3. The Cubis® II Status Center shows all information about your balance and environmental conditions, e.g. calibration, leveling, temperature, humidity, air pressure and service, centralized in a dashboard. In case of warnings or errors, you get detailed help and support.

# 4 During the Measuring Sequence, Ensure That...



1. ... the vessels used are acclimatized next to your balance; i.e., have adapted to the temperature conditions in the same room.
2. ... you do not touch the container with your hands when positioning it on the weighing pan or in a sample holder. Touching the sample vessel with your hand usually increases the temperature of the vessel. Buoyancy and air current effects influence weighing results. Remember that it takes ten minutes for these effects to subside. Use a pair of tweezers or forceps to position the vessel.
3. Avoid placing your hand inside the draft shield to ensure that no unnecessary interchange of air outside and inside the draft shield takes place and that no heat is transferred into the draft shield.
4. Avoid touching a vessel with your bare fingers at all times, as a single fingerprint can weigh up to 50  $\mu\text{g}$  and therefore have a major impact on the accuracy of your weight measurement result.
5. When weighing, ensure that no powder falls onto the weighing pan next to the vessel, as this will mean that the displayed sample weight is not what is actually in the vessel.
6. Avoid the complete interchange of air when opening the draft shield by opening only one door, where possible. Opt for using the draft shield learning capability to open the door only as far as actually necessary.
7. Carefully place the tare container on the weighing pan or in the sample holder. Avoid applying any excessive force.
8. Do not lean on or against the weighing table or rest your arm on it during the weighing procedure.

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