

ISO 8655:2022 details requirements for producing and in-use control of piston-operated volumetric apparatus (POVA), such as pipettes, including testing methods, testing environment, testing equipment, reporting requirements, requirements for measurement uncertainty, and general requirements for how POVAs work.

ISO 8655:2022 Pipette Calibration and Standards

Setting the requirements for calibration of pipette and piston-operated volumetric apparatus

Taking proper care of your pipettes is one of the critical factors affecting the quality of your work. Pipette performance can deteriorate over time due to drift of calibration, leakage, part wear, or contamination. The accuracy and precision of pipettes must be checked at regular intervals. Calibrating your pipettes is the only way to ensure they still work as intended.

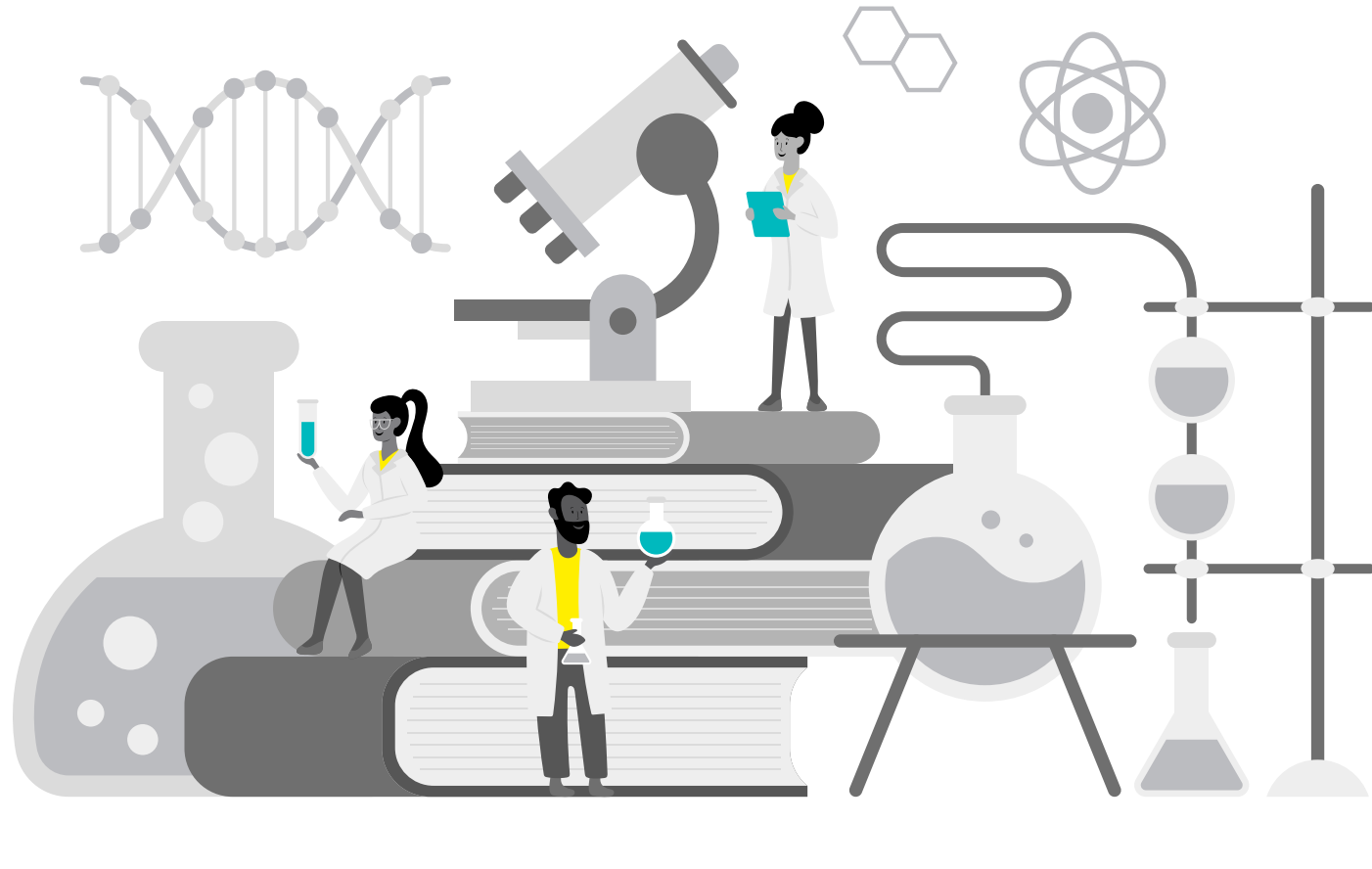


ISO 8655 is different from ISO 17025. The former describes how the calibration of a POVA is performed while the latter defines the requirements a calibration laboratory must meet to achieve valid calibration results

POVA Testing and Calibration

Calibration and test are operations that describe the relationship between the delivered volume and the corresponding selected volume of the apparatus. Measurement results are only comparable under the same conditions.

All variables that affect liquid properties must be controlled to ensure valid comparisons, POVA testing, and calibration.



Determining Calibration or Test Intervals

Factors to consider:

- Risk of application
- Frequency of use
- Number of users
- Type of liquid delivered and its vapors
- Acceptable maximum permissible errors
- Manufacturer information
- Liquid handling process
- Recommendation

What is new in ISO 8655:2022?

Two different reference measurement procedures for volume determination:



(i) Gravimetric (Part 6)



(ii) Photometric (Part 8)

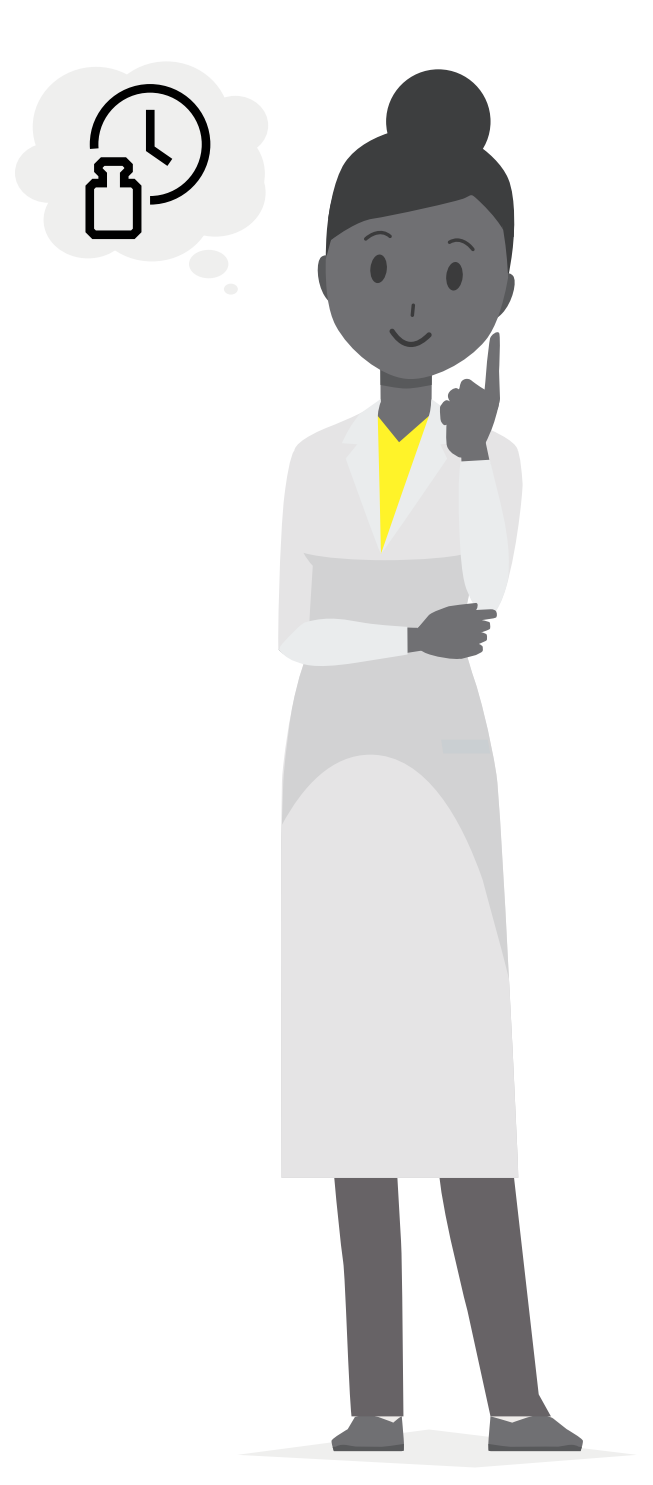
Recommendation: Follow the new ISO once it is officially published in a country.

Adapting to calibration and maintenance tolerances.

An as-found calibration or test should be carried out and a metrological confirmation should be considered before and after the maintenance or repair of a POVA. This can be done against the ISO 8655, manufacturer, or customer/user tolerances to ensure the ISO standard is fulfilled.

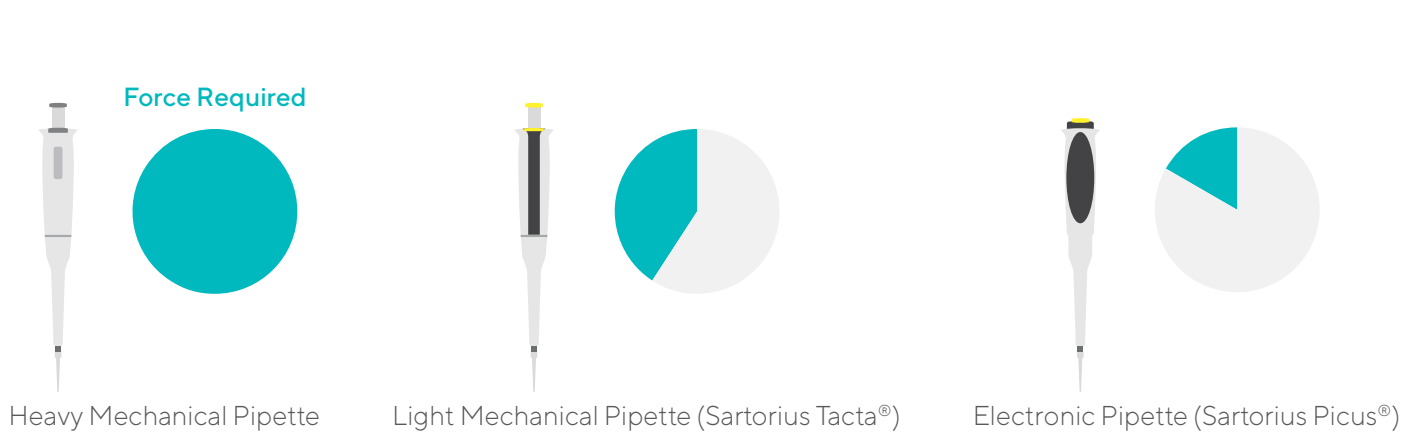
ISO parts 2, 6 and 7 require tolerances for the nominal volume, 50% of nominal volume, and 10% of nominal volume. The tests must be done with at least 10 repetitions per tested volume and at three points, minimum.

Additionally, part 6 and 7 gives the new minimum requirements for balances used for gravimetric calibration. The requirements were adapted and now ask for lower readabilities for pipettes up to 200 μ L.



Recommendation: When using third-party pipette tips, it is recommended that the tip manufacturer proves that the whole system, pipette, and tip together meet the requirements and maximum permissible errors of ISO 8655. Pipette tips must be changed at least once per calibrated volume when performing calibration or testing under ISO 8655 Parts 6 – 8.

Pipetting constitutes a large portion of bench time and can affect data reliability and the well-being of laboratory workers. Sartorius has combined ergonomic solutions with proper pipetting techniques enabling minimizations of errors due to fatigue and the risk of repetitive strain injuries.



Heavy Mechanical Pipette

Light Mechanical Pipette (Sartorius Tacta®)

Electronic Pipette (Sartorius Picus®)

Calibrating the Sartorius Way

Sartorius' Cubis MPS and Speedcal Mobile systems combine accuracy, precision, speed, and convenience to provide professional pipette calibration.



Cubis® II MPS116S

- One system
- High coverage: calibrating the 2 μ L - 5 mL pipette range according to ISO 8655
- Cost savings: Purchase, manage, and transport fewer instruments
- Always reliable: Get 1 μ g, 10 μ g or 100 μ g readability depended on your pipettes nominal volume
- Advanced ergonomics: Benefit of latest motion sensorics and an automated lid during repetitive calibration tasks
- Easy compliance: Comply with the latest requirements with desktop solution Ingenix Suite or the embedded QApp



Speedcal Mobile

- Calibrates multi-channel pipettes
- Parallel connections up to 12 balances within 10 minutes
- Available with 4, 8, or 12 channels
- Conforms to ISO 17025 and ISO 8655 regulations
- Integrated web service interface for mobile service
- Weighing capacity of 21 g per channel
- Resolution of 0.01 mg
- Stabilization time < 4 s

POVAs constitute a large portion of laboratory equipment. ISO 8655:2022 details the relevant methods for testing and calibration of POVAs to meet a precision lab's needs and requirements. Sartorius' Cubis® II MPS116S and Speedcal Mobile systems provide an accurate, precise, fast, and convenient means of professional pipette calibration that enhance your lab's standards.