

Volume setting methods

Two vs. three volumes compared

Abstract

When evaluating pipette performance, choosing one method over another may have a significant impact on the quality of the data obtained and the time required to obtain those results. One such choice is deciding on the number of volume settings necessary to determine pipette performance. The purpose of this report is to measure the difference between the three versus two volume setting method for a typical population of in-service pipettes, and predict its effect on the quality of the results obtained.

In-service pipettes

In-service pipettes are field pipettes of various ages from various manufacturers that were returned to RAININ for validation. In-service pipettes were divided into two groups; those that do not participate in a preventive maintenance program¹ (non-preventive maintenance group), and those that do (preventive maintenance group).

Test procedure

1. Evaluate² the inaccuracy and imprecision of each pipette from the non-preventive maintenance group at two volume settings (low setting is typically 10% of nominal range, high is 100%).
2. Compare results to the manufacturer's specifications. Accept only passing pipettes into survey.
3. Reevaluate the inaccuracy and imprecision of each accepted pipette at the middle volume setting (50% of nominal). Tally and compare results.
4. Repeat 1 through 3 for the preventive maintenance group and compare.

Conclusion

The risk of accepting non-conforming pipettes based on the two volume setting method would be increased by 3.7% for the non-preventive maintenance group, and 1.5% for the preventive maintenance group. In each case, this increase in risk should be measured against the additional time required (50% more) to obtain data for three volume settings.

Results

Comparison of 3 vs. 2 volume setting method by group

Pipette group	Pipettes from 2 volume setting method	Pipettes passing 3 volume setting method	% Pipettes passing 3 volume setting method
Non-Preventive Maintenance	5,737	5,523	96.3 %
Preventive Maintenance	452	445	98.5%

1) Preventive Maintenance (PM) is a feature of RAININ's Performance Verification program. Pipettes in PM receive replacement seals every visit, shafts and pistons every three years. Non-PM pipettes are checked thoroughly for functionality but do not receive PM scheduled parts unless required during inspection and repair.

2) Gravimetric analysis was used as defined in RAININ's SOP AB-15 Factory-Approved Method for Evaluating Pipette Accuracy and Precision, ©1994