

Beaumont

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Artel© PCS™ Pipette Calibration System Procedure Hematology and Coagulation-RO

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

This procedure provides instructions on calibrating digital and electronic pipettes using the Artel© PCS™ Pipette Calibration System.

II. PRINCIPLE:

The digital and electronic pipettes located in the Hematology and Coagulation department will be calibrated at least semiannually using the PCS™ Pipette Calibration System. It uses a high performance photometer and proprietary reagents to measure the actual volume dispensed by any pipette with volumes from 0.1 µL to 5000 µL. After each sampling, the PCS™ will calculate and display the volume of liquid delivered. At the end of the procedure, a printout provides the volume of each sample and group statistics.

III. ACRONYMS:

- A. Pipette Calibration System (PCS)

IV. EQUIPMENT:

- A. PCS™ Instrument
- B. PCS™ Instrument Calibrator Kit
- C. PCS™ Reagent Kit
- D. Pipettes
- E. Pipette Tips

V. STORAGE REQUIREMENTS:

- A. PCS™ Reagents should be stored in their original kit box at room temperature (18°C – 28°C).
- B. PCS™ Instrument Calibrator Kit should be **stored in darkness (closed box)** and at room temperature (18°C - 28°C) between uses to ensure the nine-month shelf life. The contents of the kit are subject to degradation with time, temperature, and **exposure to light**.

VI. EQUIPMENT CALIBRATION AND MAINTENANCE:

- A. A complete instrument calibration is performed monthly. This verifies that all responses pass for Noise, Accuracy, Inaccuracy. See Operator's Manual (PCS™ Procedure Guide) for procedure on performing instrument calibration.
- B. The instrument housing and the vial holders are cleaned with cotton swabs dipped in alcohol and they are dried with gauze.

VII. PROCEDURE:

- A. A barcode reader is located on the right hand side of the instrument. The touch bar located across the left side of the instrument is used to open and close the cover. The power button is located on the back of the instrument.
- B. The pipette to be checked should be clean and well maintained. Refer to the pipette package insert for additional information on assembly of pipette.
 - 1. Wipe the outer surface of the pipette with an alcohol pad.
 - 2. Wipe piston and seal chamber with alcohol pad.
 - 3. Lightly lubricate the seal and the piston with the lubricant.
- C. Check monthly maintenance sheet and determine if calibration is required. If calibration is required, refer to Maintenance above.
- D. To perform pipette calibration:
 - 1. Locate the PCS™ Standard Reagent Kit. The kit contains:
 - a. 50 blank reagent vials
 - b. sample solutions
 - c. Sealed calibration A standard
 - d. Insert containing Lot Code information
 - 2. There are four routine sample solutions. Use the correct solution for the size pipette to be calibrated as follows:
 - a. Range 1: For pipette volumes 200 – 5000 µL
 - b. Range 2: For pipette volumes 50 – 199 µL
 - c. Range 3: For pipette volumes 10 – 49 µL
 - d. Range 4: For pipette volumes 2 – 9 µL
 - 3. Verify that all vials (blank reagent and calibration) are clean and free of finger prints. If dirty, hold the vial by the cap and immerse the lower portion (approx 1 in) into isopropyl alcohol. Then gently wipe by rotating the vial against a lint-free wipe.
 - 4. Double click on the Artel Pipette Tracker icon on the PC next to the instrument. The log in screen will appear. One the user logs into the software, the home screen will display.
 - 5. Turn on the PCS™ instrument. The instrument will perform a system test.

6. The instrument will request a zero calibration at power on if the instrument has been off for over 8 hours or if the temperature change is greater than 2°C from previous calibration.
7. On the “Due” Taskbar, if pipettes are due for calibration, the number of pipettes due will display. By selecting the “Pipettes” option from the “Due” taskbar, it will open a list of all pipettes that are due. Find the pipette you want to calibrate from the list and highlight it. On the bottom right corner, the “Start Calibration” will appear and can be selected.
8. Follow the prompts on the PCS instrument to prepare the instrument for a pipette calibration. Select to Calibrate using the PCS™ Artel vs a manual entry option.
9. The instrument display will now state, “Self Calibration, Please Wait” and then “Scan CAL A” followed by “Insert CAL A”. Place the **sealed** CAL A standard vial into the vial holder. Be sure the CAL A label faces front. Be careful not to touch the vial except by the cap. The instrument display will prompt, “Please Close the Cover”. Close the cover.
10. The instrument display then prompts, “Please Remove Vial”. Replace CAL A into the standard box.
11. The instrument display will then prompt, “Scan Blank Vial” and then “Mix Blank, Remove Cap and Insert”. Select a blank vial, mix, open cap and insert into the instrument. This vial must not be removed or turned until the vials calibration is complete. Plan to use the entire number of available calibrations on each vial.
12. The instrument display will then prompt, “Please Close the Cover”. Close the cover and the instrument will take a blank reading.
13. Based on the pipette chosen, the instrument will display which range to use. It will require you to scan the barcode of the Range Vial needed and then prompt you to “Pipette Sample #1.” Locate the correct solution based on the size of the pipette being calibrated (see step 2). Mix gently and pour an aliquot of the appropriate sample solution into a pour over vial. Recap the sample solution bottle and return to the PCS™ Reagent Kit immediately.
14. Using the correct pipette tip and pipetting technique; pipette the sample solution from the aliquot container into the vial in the instrument and close the cover. The instrument will then mix the sample and take a reading. This reading is displayed in the “sample 1” box on the computer screen and also displays on the instrument.
15. Continue pipetting samples as instructed on the computer screen and instrument (total of 5 for each volume). Observe the Status box in the middle of the computer screen for “pass” or failed” status. If the status is “failed” you may click the redo sample box and repeat that sample again. You will not be able to repeat any samples until all five initial runs have been completed.
 - a. If you want to repeat the whole run you may click on Abort Run and click the “X” in the upper corner of the window to completely exit the calibration.
 - i. Use of Abort Run button will result in failed calibration and any remaining samples in blank vial.
16. When all 5 samples have been completed and a “Passed” status is obtained, click on the “Finish” box. Once calibration is finished, the report will automatically appear on the screen. It can be printed and signed from here. The report will then be accessible via the Reports tab on the left hand side of the home screen. The pipette is then removed from your taskbar and remains in Pipettes tab only in the “Passed” status until calibration is due again. It will appear as “Due” in the taskbar in this case.
17. Retrieve printout, sign it and place in supervisor’s mailbox for review. “X” out of the report screen and it will take you back to the due pipettes list. The next pipette for calibration can be selected.

18. Upon completion of the calibration of all pipettes, clean up the area and turn off the instrument (remember to discard the last vial from the instrument). Close out of all screens and log off of the computer.
19. Initial and date a new calibration label, and place it on the pipette.

VIII. INSTRUMENT TROUBLESHOOTING:

- A. Obtain the printouts of the group statistics. These values are calculated by the Artel Pipette Tracker software.
 - A. Verify that the %CV and % INACC are within the acceptable range for the pipette.
 - B. Place printouts in the Pipette Maintenance binder.
 - C. If the %CV and/or %INACC are outside acceptable ranges, adjust the pipette volume (see Pipette Adjustment) and repeat calibration.

Expected Values

Pipette (µL)	(%)Inaccuracy	(%)CV
5 - 10	±5	±5
20 - 40	±3	±3.5
50	±2	±2
100 - 1000	±2	±1

IX. PIPETTE ADJUSTMENT:

- A. Use pipette-specific calibration tool to adjust volume dispensed. Refer to the pipette-specific manufacturer's package insert or operator manual for instructions on pipette adjustment.
- B. Repeat the calibration.
- C. Repeat steps A and B until the volume delivered, %CV and %INACC are acceptable.

X. REFERENCES:

- A. PCS™ Pipette Calibration System Procedure Guide, Artel©, Inc., Westbrook, MA, March 1997.
- B. Pipette Tracker User Manual, Artel©, Inc., Westbrook ME, July 2004.
- C. PCS™ System User Training. Artel© support website. <https://www.artel.co/support/pcs/>.

Attachments

No Attachments

Approval Signatures

Step Description	Approver	Date
	Ann Marie Blenc: System Med Dir, Hematopath	7/2/2021
Coagulation Medical Director Designee	Marc Smith: System Med Dir, Coagulation	6/29/2021
Policy and Forms Steering Committee Approval (if needed)	Michele Sedlak: Medical Technologist Lead	6/15/2021
Policy and Forms Steering Committee Approval (if needed)	Gail Juleff: Project Mgr Policy	6/11/2021
System Manager	Rebecca Bacarella: Mgr Laboratory	6/10/2021
	Michele Sedlak: Medical Technologist Lead	6/8/2021

Applicability

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