PROCEDURE
Corewell Health East - Osmolality-Advanced Osmometer 3320 - Royal Oak

This Procedure is Applicable to the following Corewell Health sites:
Corewell Health William Beaumont University Hospital (Royal Oak)

Applicability Limited to: N/A

Reference #: 34295

Version #: 2

Effective Date: 12/03/2025

Functional Area: Clinical Operations, Laboratory

Lab Department Area: Lab - Urinalysis

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1. Principle

A. The purpose of this procedure is to provide guidance to utilize the Advanced Osmometer 3320 for diagnostic testing.

B. Advanced Osmometers are devices for the determination of the concentration of solutions by means of freezing point measurement. The osmometer utilizes a high precision thermistor to sense the sample temperature, to control the degree of supercooling and freeze induction and to measure the freezing point of the sample. The sample is supercooled to several degrees below its freezing point and then mechanically is induced to freeze. The heat of fusion suddenly liberated causes the sample temperature to rise toward a plateau wherein an ice/water equilibrium occurs. This equilibrium by definition is the freezing point of the solution.

2. Responsibility

Personnel who have completed the competency requirements will perform this testing.

3. Specimen

Acceptable specimen types include serum, plasma, and urine. Specimen must be centrifuged prior to analysis. All specimens utilize 20 microliters (µL) for analysis.

4. Reagents

A. 290 mOsm/kg Standard - Clinitrol Reference Solution
B. 50 mOsm/kg Standard
C. 850 mOsm/kg Standard
D. Biorad Liquicheck unassayed serum controls
E. Biorad Lyphocheck unassayed urine controls
F. Advanced Linearity Set – To verify or establish reportable ranges
G. Micro-Sample Test Kit (500 tests)

5. Quality Control

A. Dayshift is to run 2 samples of 290 Reference Solution.
B. PM shift is to run Liquicheck (serum) levels 1 and 2.
C. MN shift runs Lyphocheck (urine) levels 1 and 2.

D. Document QC results into Biorad Unity.

6. Calibration

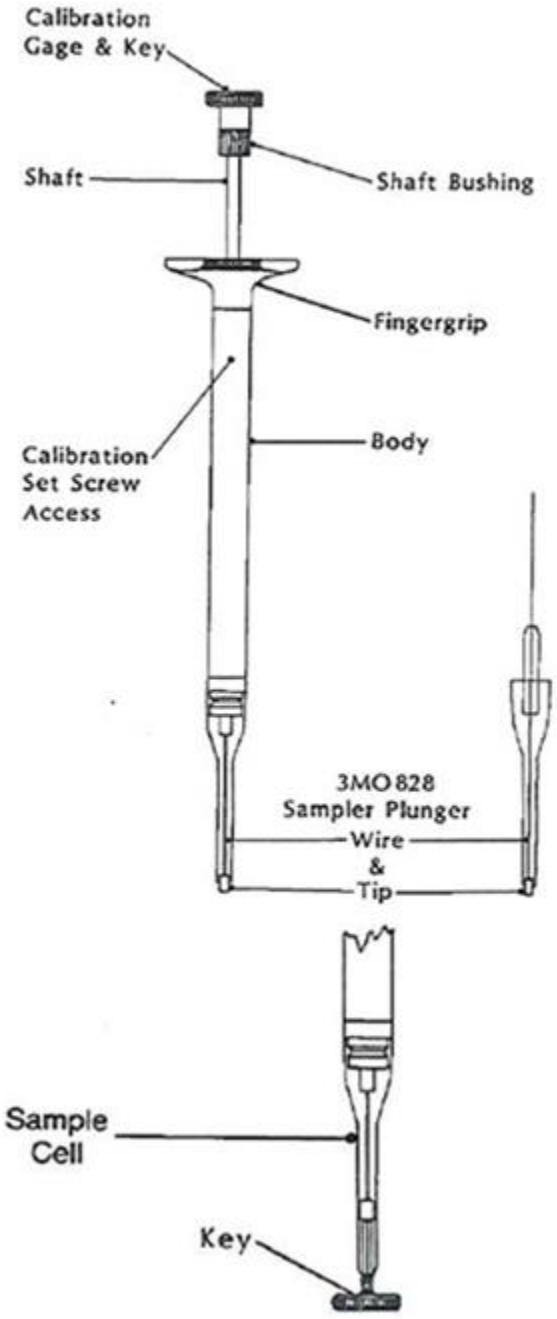
A. Calibration should be performed after opening a new micro-sample test kit, after a sampler plunger replacement and as needed (e.g. QC failure or troubleshooting)

B. Calibration of the Advanced Micro-Osmometer requires no adjustment of the instrument on the user's part. If repeatability of calibration standards is acceptable, the instrument automatically performs an internal calibration. The two necessary calibration standards are 50mOsm/kg H2O and 850 mOsm/kg H2O. The procedure is as follows.
   1. Press the CALIBRATE button. The calibration program will prompt you to run a sample of the 50 mOsm/kg calibration standard.
   2. Using the same procedure and technique described in the procedure section, run the 50 mOsm/kg standard samples until the display shows "850 mOsm calibration"
   3. Run 850 mOsm/kg standard samples until the display shows "Calibration complete". The calibration program can require anywhere between three and six 850 mOsm/kg standard samples, depending on the repeatability of the results.
   4. Verify the calibration by running a Clinitrol 290 mOsm/kg Reference Solution before running samples.

C. **Note**: If the instrument display shows: Calibration Not Complete", the calibration procedure has failed and you should carefully repeat the above procedure. If you encounter "Calibration Not Complete" a second time, please consult the section on Troubleshooting of the users' guide.

7. Sampler Plunger Replacement

A. To ensure proper instrument operation, the sampler plunger should be replaced for every 500 tests (when opening a box of sample tips).
   1. Unscrew the calibration gauge and key.
   2. Rotate the sampler shaft until the calibration setscrew appears beneath the access hole in the side of the sampler body.
   3. Place the key end of the calibration gauge in the access hole and turn counter-clockwise to loosen the setscrew.
   4. Carefully remove the old sampler plunger wire.
   5. Place a sample tip on the sampler to help you place new wire correctly.
   6. Slip the sampler plunger wire into the sample cell so the Teflon plunger tip protrudes about 1/16' or 1.6mm from the end of the sample cell.
   7. Using the key end of the calibration gauge, push the plunger into the sampler as far as it will go.
   8. Tighten the calibration setscrew with the calibration gauge.
   9. Screw the calibration gauge and key back into the top of the sampler.
   10. For verification that the wire is calibrated correctly, use the following procedure:
      a. Place a new sample tip on the sampler.
      b. Unscrew the calibration gauge and key.
      c. Insert the key end of the calibration gauge into the sample tip.
      d. Visually inspect the position of the end of the sampler plunger tip and the end of the calibration key. There should be no gap between the two.
      e. If necessary, reset the sampler plunger wire as described above.



11. Reference Solution
    a. Run 2 samples of 290 mOsm/kg Reference Solution daily to check instrument operation or to confirm your calibration. Back-to-back readings for this Reference Solution must be +/- 2 mOsm/ kg. In addition to running the 290 standard following a calibration, run levels 1 & 2 of both Biorad Liquicheck and Lyphocheck QC (Quality Control) material. Doing so will allow you to verify proper operation or recognize and diagnose problems promptly.

8. Special Safety Precautions

A. When placing sample tip on pipette, make sure it is securely fastened completely to ensure proper analysis.
B. Be careful not to crack the sample tip.
C. Never inject anything into the cooling chamber of the osmometer

9. Procedure

A. Snap a sample tip onto the sampler. The sample cell must be straight and firmly seated. Be careful not to crack the sample tip.
B. Depress the sampler's plunger and insert the sample tip at least ¼ inch below the surface of the fluid to be tested. Gently release the plunger to load a 20 µL sample.
C. Visually inspect the sample. If there are any large voids or bubbles in the sample, expel the sample and load again.
D. Blot the sides of the loaded sample cell with a soft no-lint tissue to remove any clinging droplets. Then swiftly blot the end of the cell tip to remove any fluid protruding beyond the tip. Be careful not to wick out any of the sample. The meniscus remaining may be slightly concave, but the sample must be slightly longer than it is wide.
E. Holding the sampler by the barrel, rest the sampler within the operating cradle and beneath the cradle top.
F. To start the test, push the entire operating cradle down until it reaches a stop. The osmometer will run for approximately one minute and display the result in the format "Osmolality xxxmOsm"
G. Remove sampler and discard sample tip by fully depressing plunger.
H. Insert a clean, dry chamber cleaner into sample port and rotate 4 or 5 times.
I. Withdraw chamber cleaner and insert opposite end. Rotate in the same manner and leave in the port until the next sample. Remove the used sample tip from the sampler by pressing firmly enough on the sampler plunger to dislodge the tip. Discard the used sample tip.
J. Blot the Teflon plunger tip with a soft, no-lint paper tissue. Be careful not to dislodge the tip.

10. Maximum Reportable Range

A. 0 – 2000 mOsm/kg

11. Reference Range

A. Serum 275 – 295 mOsm/kg
B. Urine 300 – 1200 mOsm/kg

12. Results/Interpretation

Result for osmolality is the displayed number.

13. Revisions

Corewell Health reserves the right to alter, amend, modify or eliminate this document at any time without prior written notice.

14. References

A. Advanced Users Manual Model 3MO, Advanced Instrument, Inc., Needham Massachusetts.
B. Advanced Micro-Osmometer User Manual Model 3300. Advanced Instrument, Inc. Norwood Masachusetts.

15. Procedure Development and Approval

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16. Keywords
Not Set