

SMO - 3740

Semi-Micro Osmometer



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Analytical Technologies Limited

An ISO 9001 Certified Company

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►► Features

The Semi-Micro Osmometer can determine the exact freezing point of aqueous solutions. The osmolality of various samples like pharmaceutical solutions or soft drinks can thus be easily determined.

1 Variable & small sample volume (50 — 150 μ l)

2 Fast measurement of solutes (\sim 2 min)

3 Easy & user-friendly handling

►► Theory of osmolality

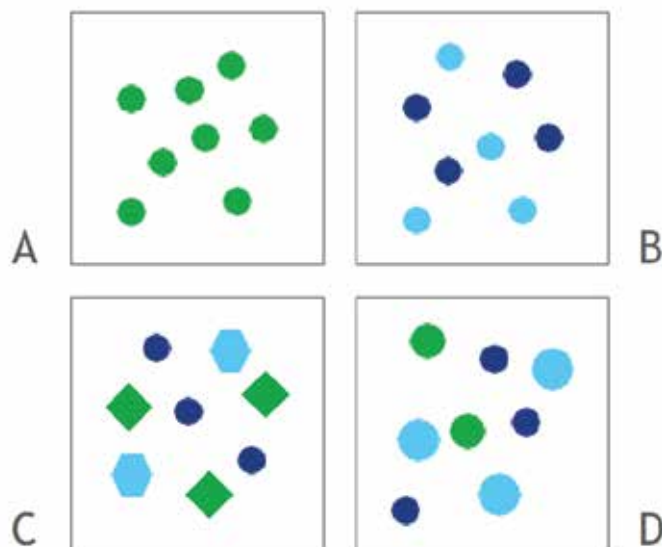
Osmolality is a general measure of the particle concentration in a solute. It's not depending on the nature of molecules but just their number. Therefore, a two molar solution of an non-dissociating molecule

(A) has the same osmolality as a one molar solution of a fully dissociating salt composed of two ions

(B). The osmolality of a solution is the same, even when molecules vary in shape

(C) as well as in size

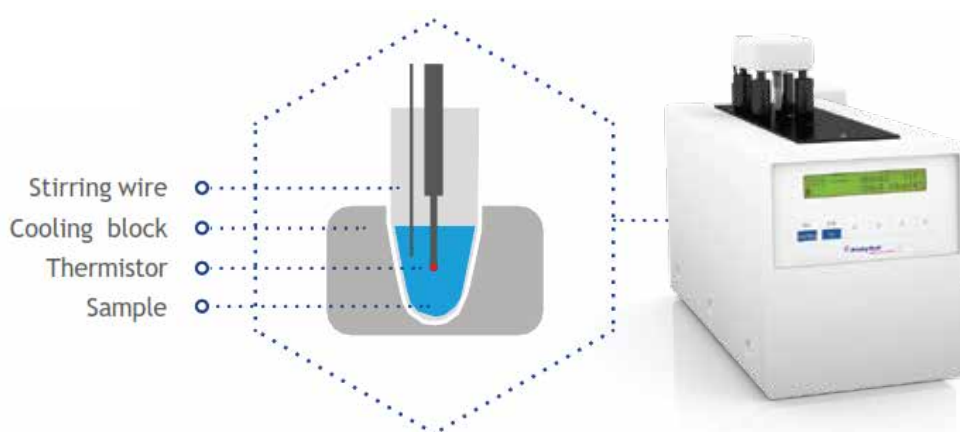
(D). Therefore, all solutions containing the same number of osmotically active particles — regardless of their chemical properties— exhibit the same osmolality.



►► Freezing point osmometry

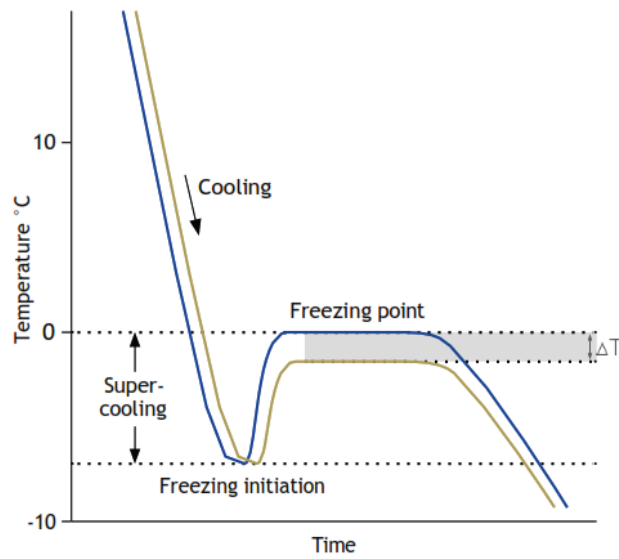
The measurement principle of the Semi-Micro Osmometer is based on the colligative property of freezing point depression. If a solute is added to a liquid this results in a decreased freezing point of the solution. The depression is 1.858 K per 1 mole of ideally solved compound in one liter of water.

This effect depends only on the number of particles in the liquid and not on the physical or chemical properties of the solutes. Due to this linear correlation, the osmolality of a sample can be determined by precisely measuring its freezing point.



►► Measuring process

At the beginning of a measurement the sample is cooled by a microprocessor-controlled peltier element. During this process, the solution is super-cooled below 0 °C while still being liquid. At a certain temperature the freezing process is initiated by a rotation of the stirring wire. The formation of ice crystals causes the release of thermal energy, thus rising the temperature of the sample. After a short period of time an equilibrium is reached where melting and thawing of ice crystals are balanced and the sample's temperature stays constant. This plateau marks the real freezing point of the sample. During the whole process the temperature of the solution is measured by a high-precision thermistor. Thanks to a resolution of 1 / 1000 K the freezing point temperature is exactly determined and even small differences in osmolality of two samples can be measured.



►► Semi-Micro Osmometer



RS-232 interface

Connection for printer or software control.

Measuring head

With the stirring wire and its high-precision thermistor the measuring head is a key component of the osmometer.

Parking position

The four pedestals ensure safe storage of the measuring head while the device is not in use.

Control via keypad

The instrument can be fully controlled via the keypad. All settings for calibrations and measurements can easily be changed and displayed.

Casing

Small and robust design that saves bench space.



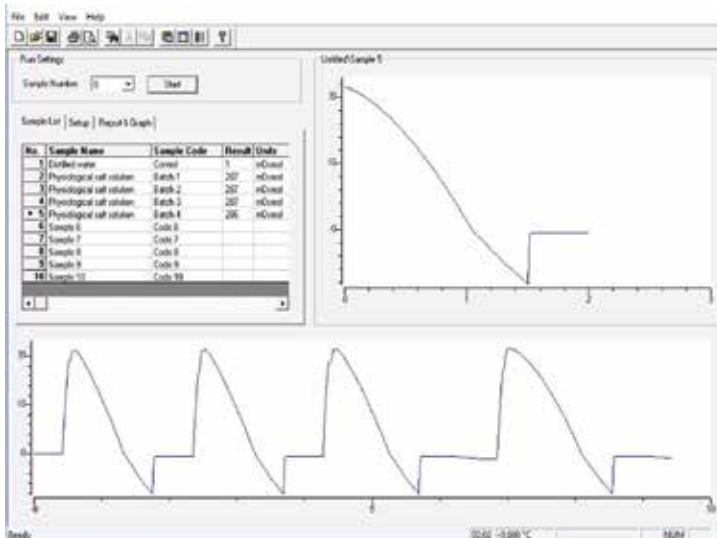
**►► Technical data**

| | |
|--------------------|---|
| Sample volume | 50 — 150 µl |
| Osmolality range | 0 — 2 000 mOsmol/kg |
| Resolution | 1 mOsmol/kg |
| Test time | 2 min |
| Precision | SD ≤ 4 mOsmol/kg [0 — 400 mOsmol/kg], RSD ≤ 1 % [400 — 2000 mOsmol/kg] |
| Calibration | Two-point calibration (0 mOsmol/kg and one free selectable osmolality), optional: Three-point calibration (0 Osmol/kg and two free selectable osmolalities) |
| Dimensions | 160 × 182 × 340 mm (W × H × D) |
| Weight | 4.5 kg |
| Ambient conditions | 10 — 35 °C, 20 — 80 % relative humidity (noncondensing) |
| Linearity | ± 1.5 % [0 — 2000 mOsmol/kg] |
| Interfaces | RS-232 port |
| Control | Keypad (LC display, 2 rows with 24 characters) Optional: software |
| Power supply | 100 — 240 V, 50 — 60 Hz, 70 W |

►► control software

The SMO 3740 Semi-Micro Osmometer is a standalone device. Therefore, all functions of the instruments are accessible via the keypad. For additional storage and data management functions users can work with the software. It offers a user-friendly interface to control the SMO 3740 Semi-Micro Osmometer via PC. Measurement parameters can easily be changed and sent to the instrument via the software. For each sample a temperature curve is displayed to visualize the measurement process.

Samples can be named individually and the measurement results can be saved for archiving. The data can also be exported in different file formats (e.g. *.xls, ASCII or Tabdelimited text files). Thus, also the import to laboratory information management systems (LIMS) is possible. Supporting the use of a barcode scanner, sample identification can be transferred automatically reducing the risk of wrong sample assignment.



- Change settings more easily
- Visualization of the measurement
- User-friendly interface

Operating systems

- Windows XP
- Windows Vista
- Windows 7
- Windows 8

PC hardware

The system requirements for installation of the software are very low. In general, SMO 3740 is working on every PC that is suited for one of the listed operating systems. One RS-232 port is required for connection to the instrument.

►► Applications of freezing point osmometry

Freezing point osmometry is a fast and reliable method to determine the osmolality of various solutions. In combination with the small sample size required and the simple measurement procedure it is a preferred method for laboratory analysis in industry and academia.

Quality control of pharmaceutical solutions

The osmolality of solutions used in the clinical and pharmaceutical field is an important issue that requires regular monitoring. Especially infusion solutions but also solutions for external use like eye drops and rinsing solutions have to be isotonic to ensure the physical well-being of the patient. Therefore, strict quality control is needed. The SMO 3740 allows a quick analysis of such solutions and provides reliable results even with small sample volumes. Thanks to the broad measurement range, high osmolality solutions can also be analyzed.

Analysis of isotonic infusion solutions

Three commonly used infusion solutions were analyzed regarding their osmolality. All of them were in the range of human Plasma (290 ± 10 mOsmol/kg) and thus are suited for therapy. Physiological saline solution is also used for inhalation, rinsing or as eye drop solution. The correct osmolality is crucial for these treatments as well.

Analysis of isotonic drinks.

Isotonic drinks are becoming more and more popular among professional and amateur athletes. Due to their special composition, contained nutrients and minerals can be rapidly resorbed and thus shall allow a fast recovery after exhausting sports activity. In contrast, non-isotonic drinks as normal cola or beer need to be diluted in the intestine prior to adsorption. Thus, these beverages rather have a dehydrating effect. Since osmolality of the solution is the critical feature in this context, an exact test method is needed. For this determination, the SMO 3740 Semi-Micro Osmometer is perfectly suited because it works independently of sample composition. Therefore, drinks as diverse as sugar-containing soft drinks, their sugar-free counterparts as well as alcoholic and non-alcoholic beers and many more can easily be analyzed. This renders it a fast and reliable method for both quality control and for comparing different drinks regarding their potential beneficial effect.

Analysis of several isotonic and non-isotonic drinks.

Six different samples of isotonic and non-isotonic drinks were analysed using the SMO 3740 Semi-Micro Osmometer. All beverages advertised to be isotonic, had osmolality values within the range of 300 mOsmol/kg \pm 10% (grey bar). Thus, they met the specifications for isotonic drinks defined by the European Food Safety Authority. In contrast, a usual softdrink or an alcoholic beer exhibited much higher osmolalities.

BEVERAGES & FOOD

For analysis and quality control of beverages like isotonic drinks and beer.

PHARMACEUTICS

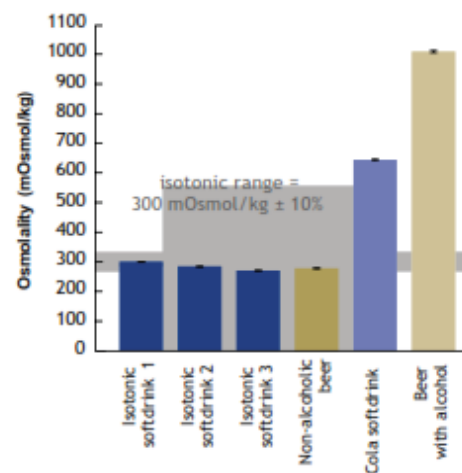
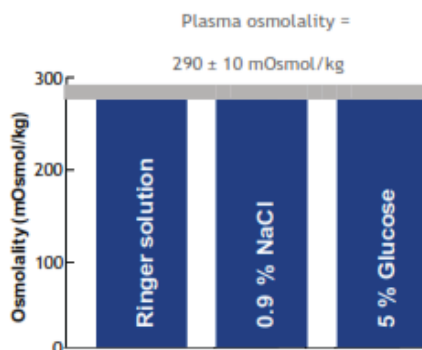
For quality control of infusion solutions, inhalation, rinsing solutions and eye drops.

INDUSTRY

For process monitoring and quality checks of reagents and chemicals.

ACADEMIA

For research on plant sap and insect haemolymph and testing of nutrient solution and cell culture media.



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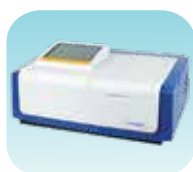
Instruments :Instruments :We offer instruments/Renting Services Modules like pumps,detector etc. on Rent.



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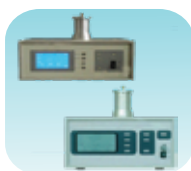
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Liquid Particle
Counter



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Spectrophotometer



DSC/TGA



Semi Auto Bio
Chemistry Analyzer



HEMA 2062
Hematology
Analyzer



Micro Plate
Reader/Washer



URINOVA 2800
Urine Analyzer



Total Organic
Carbon 3800



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TOC
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Size Analyzer



Ion Chromatograph



Water purification
system

Regulatory compliances



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2. Improving quality of life by offering YOGA Training courses, Work shops/Seminars etc.

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