

Micro-Osmometer

Type 15

AUTOMATIC



Sample volume 100 μ l · Measuring time approx. 1,5 minutes

Simple operation with menu-led display

Clear sample identification with keyboard and time clock

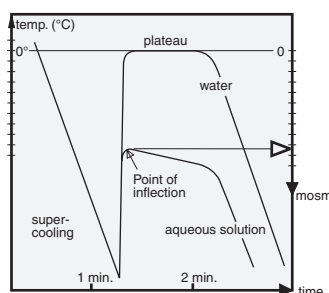
Single-use plastic sample tubes · Air cooling



Measuring Principle

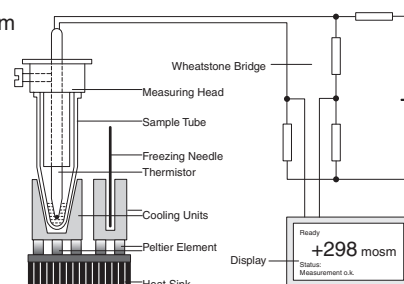
The freezing point of aqueous solutions is measured. The depression of freezing point compared to pure water is directly related to the osmotic concentration. Pure water freezes at 0°C, an aqueous solu-

Typical cooling curves of water and aqueous solutions



tion with an osmolality of 1 osmol / kg water at $-1,858^{\circ}\text{C}$. 1 Mol of a substance dissolved in 1 kg of water gives a solution with an osmotic concentration of 1 osmol / kg water only if it is an ideal solution and if the substance does not dissociate.

Schematic diagram



Function and Description

The sample (serum, blood, urine or any other aqueous solution) is filled in a plastic sample tube and cooled via a Peltierelement. These are semiconductor devices, which become cold on one side and warm on the other when electrical current flows through. The cold side cools the sample whilst the heat from the warm side dissipates into the air by convection.

The Löser-Osmometer transports the warmth via cooling surfaces into the atmosphere, an extra water supply is not necessary. Operation of the instrument requires only an electrical socket. The temperature on the cold side is kept electronically constant.

During the measuring process the temperature of the sample is measured by a thermistor (a temperature dependent resistor). This is part of the measuring head onto which the tube is placed.

The measuring head is attached to guide rods which protect it from accidental damage.

At a defined supercooling the freezing process is started by lowering a needle with ice crystals into the sample tube. The freezing point of the sample is reached.

The method of initiating the freezing process is important for the reproducibility of measurements. Dipping a needle with ice crystals into the sample gives more exact results than stirring with a wire which is constantly dipping into the sample. Because of linear correlation between osmolality and freezing point the measurement of freezing point is a determination of osmolality. The results are displayed as mosm / kg H₂O.

Technical Data

Sample volume: 100 µl or 50 µl

Measuring time: approx. 1,5 minutes (100 µl)

Reproducibility: $\pm 0,5\%$

Measurement range: 0 ... 2500 mosm / kg H₂O

Measurement display changeable (mosm / m°C)

Measurement memory: 100 measurements with sample numbers

Data interfaces: 3 x RS 232 for printer, handscanner and PC

Power supply: 230V AC (100/115V AC on request) approx. 45 VA

Dimensions: Width 180 mm, height 278 mm, depth 216 mm

Weight: approx. 6,3 kg The Instrument is CE-labelled

Accessories included:

50 plastic tubes, 2x10 vials of standard solution 300 and 900 mosm / kg H₂O, Spare thermistor, spare needle, spare fuses, Cleaning fluid and little funnel for cleaning needle hole, Data transmitting cable and program, operating instructions.

Subject to technical changes.

Calibration

The zero point is calibrated with distilled water and a standard point with the NaCl-solution of 300 mosm / kg H₂O supplied. Occasional checks shows that the calibration is very stable. An additional 900 mosm-solution can be used to calibrate, whereby the linearity is raised by higher concentrations.

Special Features and Advantages

- Menu led operation on a wide illuminated LCD graphic display.
- Selectable language.
- Single use plastic tubes.
- Blocking of measuring tube or needle by freezing in stand-by mode is counteracted by regular automatically defrosting.
- Needle can be rinsed with water or disinfection solution.
- The parameters of the RS232 interfaces can be configured via the menu.
- Integrated real time clock to sort measurements and calibrations.
- Reduced operating costs as no extra water supply is necessary.

Operating of the Instrument

- Switch on instrument, wait for ready display (approx. 3 minutes).
- Place 100 µl sample in the sample tube ($\pm 10\%$).
- Place the sample tube onto the measuring head.
- Lower the measuring head. The sample tube is dipped into the cooling slot.
- Enter sample number using the keyboard or the handscanner. These entries can also be made after measurement.
- Supercooling is reached after 1 minute and the needle with the ice crystals is dipped into the sample.
- As freezing point is reached, the display shows the measurement value in mosm / kg and the instrument gives an audible tone. The measurement value is stored in the memory.
- Slide measuring head from cooling slot and remove the sample tube.
- Wipe the thermistor with a soft tissue.

Extra Accessories:

- Barcode-handscanner for reliable and fast registration of samples
- Dot-matrix printer for results
- Analogue output for XY-plotter
- Calibration solution 900 mosm / kg H₂O