

SHERWOOD SCIENTIFIC CHLORIDE ANALYSERS

AN INSTRUMENTAL
ANALOGUE OF
ARGENTIMETRY



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Sherwood

SHERWOOD SCIENTIFIC

MODEL 926 & 926S

Designed for the determination of Chloride ions, the Sherwood Scientific Chloride analysers are an instrumental analogue of "Argentimetry"; the traditional titrimetric methods using Silver Nitrate reagent. Like those classic methods, the 926 and 926S rely on formation of the insoluble salt, Silver Chloride.

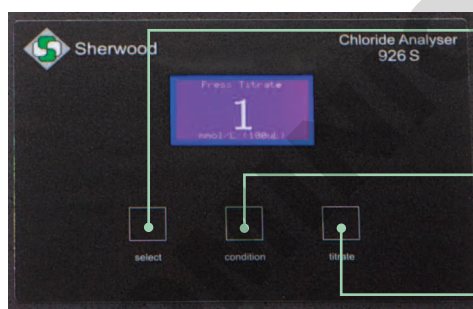
The importance of Chloride determination was realised well over a century ago, with many variations and changes being made in order to improve detection limits and selectivity. Research into Chloride analysis was conducted by Gay Lussac (1832), Levil (1853), Mohr (1856) and Volhard (1874). Their findings are the basis of methods still in common use today.

The first instrument using these techniques was developed in the 1960's by Cotlove at the AMINCO Company. The 926 analysers developed from that first instrument are now exclusively manufactured in Cambridge, UK by Sherwood Scientific Ltd.

METHOD OF OPERATION

The main difficulties with the classic Argentimetry methods were photochemical reaction of Silver Nitrate reagent on storage and the visually weak titration end point. The methodology required a highly skilled analytical technician.

The 926 method is based on a coulometric titration wherein the reagent (Silver ions) is precisely and quantitatively generated, at the time of analysis, by passing a constant current between electrodes. The end-point is determined when excess Silver ions cause a change in conductivity; detected by the detector electrodes.



1. Select Button. For the 926; factor conversion of mg/l Cl to mg% Salt. For the 926S; selects sample volume of 100ul or 20ul
2. Condition Button titrates any contaminant in buffer and sets to endpoint.
3. Titrate Button Initiates titration sequence

PIPETTING AND ACCURACY OF THE 926 CHLORIDE ANALYSERS

The accuracy of the method is directly affected by the volume of sample dispensed by the pipette. A fixed volume: 500µl for the Model 926; 100µl or 20µl for Model 926S, is pipetted into the Buffer solution. A further 6 samples (Model 926) or 19 samples (Model 926S) may be added into the Buffer before the instrument prompts a reagent change.

KEY APPLICATION AREAS

Industrial Model 926

The measurement of Salt (Sodium Chloride) in the Food and Dairy Industry is universal. The ability to read directly, Salt concentration and the automatic endpoint detection system has made the 926 the instrument of choice for food manufacturers and analysts throughout the world.

Salt and salinity also represent serious contamination in many industrial processes. The sensitivity of the coulometric method enables ppm range measurement in boiler feed water; polymer washes; borehole slurries as well as soil salinity studies. The 926 is intended for general laboratory use and is calibrated in ppm (mg/l) Chloride. The Select Button offers the immediate conversion of Chloride content into mg% Salt (Sodium Chloride) of the original sample*.

* assumes ratio 1g of sample to 100ml diluent

Clinical Model 926S

Raised Chloride concentration in sweat of young children is a Cystic Fibrosis indicator. The 926S is intended for Chloride measurement in biological samples and calibrated in mmol/L. The 926S can accept original samples of as little as 20µl and from all types of sweat generators. The Select Button switches between sample volumes of 20µ or 100µl

REAGENTS

Chloride Analyser Buffer

A non-hazardous mixture of acids with other components designed to give highly reproducible results when used with the Models 926 and 926S. It provides the medium required for the dissolution and reaction between the Silver and Chloride ions.

Chloride Standards

Available at 200mg/l and 100mmol/l; both are traceable to NIST standards. These stable solutions are used to verify instrumentation calibration and accuracy and precision of pipetting operation.

Silver Electrode Polish

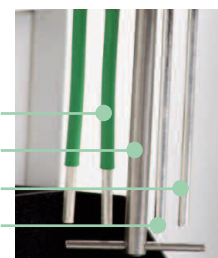
Used to keep the Silver electrodes in good condition.

Electrodes

The anode is a pure Silver electrode, which is "sacrificed" by dissolution into Silver ions. Once the end of the electrode is dissolved the anode can be repositioned for extended use. The cathode completes the electrical circuit with the anode. Two detector electrodes monitor the conductivity of the reacting solution.



Detector Electrodes
Stirrer
Anode
Cathode

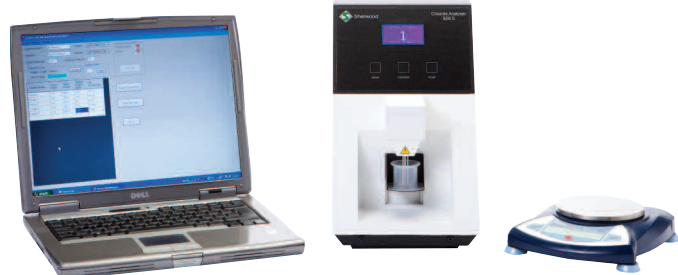


SHERWOOD SCIENTIFIC

MODEL 926 & 926S

THE 926 ADVANTAGE

- The coulometric method is very robust and versatile.
- These microprocessor based Instruments are ergonomically designed, easy to use and maintain
- The Sherwood Chloride Analyser Buffer system, specifically designed for the model 926 and 926S, gives outstanding sensitivity and selectivity.



ACTIVE SALT SOFTWARE

(Not for use with the 926S)

Active Salt Software was developed to enhance the 926 Chloride Analyser. Designed initially for the Cheese industry, the software may be applied to any food product requiring salt analysis in a food processor's QA/QC Lab. Active Salt can collect data from a balance with RS232 output and Chloride analyser results. One PC with one Active salt package can collect data from two analysers and two balances

Advantages include:

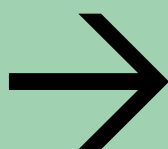
- No transcription errors
- Instant product salt content calculations
- No need to achieve specific sample and diluent weights

Instrument Model	926	926S
Application	Industrial	Clinical
Units	mg/l	mmol/l
Sample size	500µl	100µl or 20 µl
Readout Range	10- 999 mg/l 2-165 mg% Salt	10-299 mmol/l
Accuracy	±3 mg/l at the 200 mg/l level	Results would be within one Standard Deviation of the mean values of recognized QC schemes i.e. within ±2.2 mmol/l at the 100 mmol/l level
Reproducibility	CV < 1% for 20 replicate samples @ 200 mg/l (excluding pipetting errors)	CV 100µl sample <1% 20µl sample <1.5%
Measurement time	36 seconds to 200 mg/l	26 seconds to 100 mmol/l
Voltage (Mains adapter input)	100 - 240V ~, 50 - 60 Hz, 0.6A	100 - 240V ~, 50 - 60 Hz, 0.6A
Size	315 mm x 200 mm x 250 mm	315 mm x 200 mm x 250 mm
Packed Size	385 mm x 370 mm x 450 mm	385 mm x 370 mm x 450 mm
Net Weight	1.9 kg	1.9 kg
Gross Weight	5.4 kg	5.4 kg
Packed unit contains	Model 926, Printer cable 9 way RS232, Buffer (500 ml), 200mg/l standard (100ml), 1 pack of anodes, 1 pack of electrodes, 2 marked beakers, Silver Electrode Polish, Stirrer, Operator Manual, Universal Mains adapter and USB lead A(M) - B(M)	Model 926S, Printer cable 9 way RS232, Buffer (500 ml), 100 mmol/l standard (100ml), 1 pack of anodes, 1 pack of electrodes, 2 marked beakers, Silver Electrode Polish, Stirrer, Operator Manual, Universal Mains adapter and USB lead A(M) - B(M)

ORDERING INFORMATION

Model 926 Chloride Analyser	926 00 009	100mmol/litre Standard	6 x 100ml	00156202
Model 926S Chloride Analyser	926 00 109	200mg/litre Standard	6 x 100ml	00156203
Silver Anodes (pack of 3)	92511003	Chloride Analyser Buffer	1 x 500ml	00156208
Electrode detectors and cathode	92511002	Silver Electrode Polish		00156205
Active Salt data collection and salt analysis package	92686500			

INTRODUCTION AND HERITAGE



Sherwood Scientific Ltd., develops and manufactures a range of scientific instruments and apparatus with application in many industries, as well as in education and research.

Known for high quality and reliability, Sherwood Scientific products are all manufactured at the company's base in Cambridge, UK and sold and supported through an extensive distributor network covering over 80 countries. Fully equipped training and laboratory facilities enable Sherwood Scientific to offer courses to our distributors on all products and to undertake

consultancy projects in analytical measurement and process control. The history of Sherwood Scientific can be traced back more than 70 years to applications of the selenium photocell in early Flame Photometers – now the largest and most diverse of our product lines. The company's heritage also encompasses the Lab Scale Fluid Bed Dryer and Magnetic Susceptibility Balance developed under the auspices of Johnson Matthey, and the acquisition and further development of several Corning and CIBA Corning instruments: Colorimeters and Chloride Analysers.

PRODUCTS

FLAME PHOTOMETERS

Building upon the acclaimed Corning M410, we now manufacture the widest range of Instruments and Accessories: single and multi-channel, with analogue and digital outputs, free-standing and software controlled units and automated analysis packages for Sodium, Potassium, Lithium, Calcium, Barium, Cesium, Rubidium and Strontium analysis

MODEL 501 FLUID BED DRYER

This is a bench top, lab-scale, programmable Fluid Bed Dryer. The microprocessor controlled base unit accommodates the widest range of tub configurations and materials. We select inlet and outlet filters to complement a broad variety of sample types and particle sizes. With in-tub temperature and humidity feedback capability coupled to a software package providing real-time drying condition feedback. This unit allows rapid development of drying protocols and understanding of material drying behaviour.

CHLORIDE ANALYSERS

Our Chloride analysers use coulometric titration technology; offering the best available means of Chloride determination in food, pharmaceutical and industrial products etc. In addition sweat chloride measurement is also possible, (with samples as small as 20ul), as required for assistance with Cystic Fibrosis confirmation.

CHROMA COLORIMETERS

Our CHROMA Colorimeter range offers two fully open, programmable units; which may be utilised with any commercial test kits for water quality monitoring, clinical chemistry measurements and many other colorimetric determinations. We also have a digital equivalent to the renowned Corning 252, for instant, no frills, reliable Absorbance & %Transmission measurements.

MAGNETIC SUSCEPTIBILITY BALANCES

For those studying magnetic properties of materials, our Magnetic Susceptibility Balances offer unsurpassed sensitivity and reliability. We truly are world leaders in this field of analytical chemistry



Sherwood Scientific is represented by a worldwide network of distributors, details of whom can be found on our website.
Please contact us for further information or visit us at

www.sherwood-scientific.com

for full product information, application & technical advice and basic theory of principles of operation.