
SHERWOOD SCIENTIFIC CHLORIDE ANALYSERS

DESIGNED FOR THE DETERMINATION
OF CHLORIDE IONS, THE SHERWOOD
SCIENTIFIC CHLORIDE ANALYSERS
ARE AN INSTRUMENTAL ANALOGUE
OF "ARGENTIMETRY"



CHLORIDE ANALYSER

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.

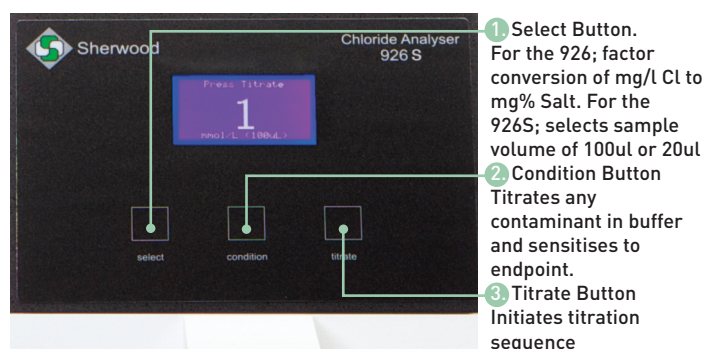
The importance of chloride determination was realised well over a century ago, with many variations and changes being made in order to improve detection limits and selectivity. Research into chloride analysis was conducted by Gay-Lussac (1832), Levil (1853), Mohr (1856) and Volhard (1874). Their findings 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 method 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 where 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 detected when excess silver ions cause a change in solution conductivity which is detected by sensing electrodes.



PIPETTING AND ACCURACY OF THE CHLORIDE METERS

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; 100 or 20 µl for Model 926S) is pipetted directly into the Acid Buffer solution. A further 6 samples (Model 926); 21 samples (for the Model 926S) may be added into the same 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; bore-hole 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 20ul or 100ul

REAGENTS

Acid 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

Calibrated both in mg/l and mmol/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

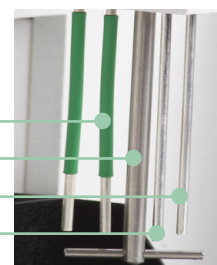
Used to keep the silver electrodes in good condition.

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
Constant Stirring
Anode
Cathode



CHLORIDE ANALYSER

ADVANTAGE

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



DATA MANIPULATION WITH ACTIVE SALT

The models 926 and 926S are equipped with RS232 serial and USB- outputs which enable them to be linked to a suitable printer or to be interfaced to a PC hosting **Active Salt Software**; developed to enhance the Model 926 Chloride Analyser. Designed initially for the Cheese industry, the software may be applied to any food product requiring salt analysis and documentation; the software may be configured by the operator to suit their particular laboratory requirements. The Active Salt package can collect data directly from a balance with RS232 output together with the Chloride analyser results. Some of the advantages are;

- No transcription errors
- No time wasted doing manual calculations
- No need to achieve specific sample and diluent weights
- Automatic data storage and analysis report generation.

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 100 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, Acid buffer (500 ml), 200 mg/l standard (100ml), 3 anodes, set 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, Acid buffer (500 ml), 100 mmol/l standard (100ml), 3 anodes, set 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	200mg/litre Standard	6 x 100ml	00156203
Model 926S Chloride Analyser	926 00 109	Silver Electrode Polish		00156205
		Electrode detectors and cathode		92511002
Active Salt data collection and salt analysis package	92686500	Silver Anodes (pack of 3)		92511003
100mmol/litre Standard	6 x 100ml	Plastic Beaker		92611001
	00156202	Combined acid buffer	1 x 500ml	00156208

INTRODUCTION AND HERITAGE



Based in Cambridge, a centre of Scientific Excellence in the UK, Sherwood Scientific Ltd is a manufacturing company with a history of successful innovations and developments designed to provide continual improvement and added value to its product range.

Sherwood Scientific Ltd produces a world renowned product range including CHROMA Colorimeters, Flame Photometers and Chloride Analysers; whose origins can be traced back to the 1950s, with continuous

developments since then by Corning prior to acquisition of all manufacturing and design rights by Sherwood in the 1990's. Sherwood Scientific Ltd also manufactures the MICROWELDER gas generator based flame welding system used in jewellery, electronics and acrylic sign manufacturing; a programmable Laboratory Fluid Bed Dryer; and the world's most sensitive Magnetic Susceptibility Balance. These products have a history which can be traced back to the Johnson Matthey Instrument division.

SHERWOOD SCIENTIFIC PRODUCT RANGE

Flame Photometers

We have a complete range of Flame Photometers; from single channel to multi-channel, analogue to digital, computer controlled and automated analysis packages for Sodium, Potassium, Lithium, Calcium, Barium, Cesium, Rubidium and Strontium analysis

Clinical and Industrial Chloride analysers

We also manufacture Clinical and Industrial Chloride analysers based on coulometric titration technology; offering the best available means of Chloride determination in food, pharmaceutical and industrial products etc. In addition clinical chloride measurement is also possible for example, with samples as small as 20ul of sweat as may be required for Cystic Fibrosis confirmations.

CHROMA colorimeter range

Our CHROMA colorimeter range has wide utility. These fully open, programmable units, with three absorption unit capability across the whole wavelength range may be utilised with any commercially

available test kits for water quality monitoring, clinical chemistry measurements and many other colorimetric determinations.

Model 501 Fluid Bed Dryer

The bench top, lab-scale, programmable Model 501 Fluid Bed Dryer offers a microprocessor controlled base unit with the widest range of tub materials and configurations; with inlet and outlet filters to match a broad variety of sample types and particle sizes. With in-tub temperature and humidity feedback capability coupled to a powerful software package providing real-time drying condition feedback and display; this unit allows rapid development of drying protocols and understanding of material drying behaviour.

Magnetic Susceptibility Balances

For those engaged in study of the 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 distributor network. Our distributors and their customers attend courses on existing and new products at Sherwood's facility in Cambridge. Sherwood can also be contacted via the Internet where news of products, applications and other information is available. For more information and a list of our distributors in your locality visit our website and/or send an email.