



Good Value • Quality Performance

Coulometric Chlorine Analyzer

ELEMEN+ CLS3000



Achieve More & Measure with Confidence with
ELEMEN+ CLS 3000 Coulometric Chlorine Analyzer

Zn

K

Cl

Na

The **ELEMEN+ CLS3000** system uses micro-coulometry technology and combined with its advanced software to control micro-coulometric titration. It allows measurement of chlorine content in solid, liquid and gaseous samples down to low ppm level.

The **ELEMEN+ CLS3000** features reliability, robustness and stability in one compact footprint. It is widely used to analyse liquid and solid samples such as fuels, oils, minerals, used solvents, edible oils, waste water, chlorinated PVC, plastics, etc.



The system conforms to the following testing methods for chlorine testing:

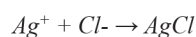
- ASTM D5808-03 Microcoulometer for the Determination of Organochlorine in Aromatic Hydrocarbons and Related Compounds
- ASTM D5808-09a Standard Test Method for Determination of Chlorine in Aromatic Hydrocarbons and Related Chemicals by Microcoulometric Analysis
- ASTM D4929-2007 Test Method for Determination of Organic Chlorine Content in Crude Oils
- ASTM D5194-06 Traces in Liquid Aromatic Hydrocarbons Chloride test method
- UOP779-08 Chloride in Petroleum Distillates by Microcoulometry
- SY/T7508-1997 Determination of total sulfur in liquefied petroleum gas in oil and gas fields - Oxidation microcoulometric method
- SH/T1757-2006 Determination of organochlorine in industrial aromatic hydrocarbons Microcoulomb method
- GB/T 18612-2001 Determination of Organic Chlorine Content
- Test method for total chlorine content in Appendix B of GB 23971-2009.

Measuring Principle:

When a sample containing Chlorine is combusted at a high temp around 1000°C, Hydrogen Chloride is formed (HX), as illustrated in the equation below:

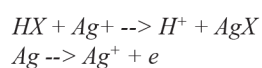


In the titration cell, when the system is in the equilibrium state, the Ag^+ ions are at a constant concentration. After combustion, the carrier gas (Argon or N_2) will move the chloride ions into the titration cell. This chloride ions will react with silver ions as illustrated below:



The amount of charge used to regenerate the lost silver ions, is directly related to the total chloride present in the sample. The amount of current compensated during the electrolysis can be measured, and the total chlorine content in the sample can be obtained according to Faraday's law of electrolysis.

The equations for this reaction are:



Features & Characteristics

- Micro-coulometry technology. Equipped with Advanced Software for parameter setting, data acquisition and data processing. Software runs on latest Windows OS and it is easy to operate.
- Standard Model comes with Chlorine capability. It can be used to analyze Sulfur (coulometric method) by addition of platinum electrode (optional).
- Wide application scope and with good adaptation capability. It can be used to determine the sulfur or chlorine in liquid, gas or solid materials. Selected accessory is needed for different sample type.
- Intuitive and user-friendly software. It will perform straightforward analysis parameter setting, data collection, processing, saving and printing automatically.
- It needs less sample. Only 10 μ L for each test. The testing time is short. Analysis is completed in less than 3 minutes for each sample
- Absolute titration method. No need to calibrate (there is a possible to calibrate if you wish).

ELEMEN+ CLS3000 Coulometric Chlorine Analyzer

Standard Accessories Supplies:



The CLS3000 system when delivered, will be provided with the following accessories:

- ELEMEN+ CLS3000 Chlorine Analyzer Mainframe
- Sample Delivery Module
- Titration Cell
- Quartz Tube
- Standard Reference Material for Chlorine (Cl)
2mg/l, 5mg/l, 10mg/l
- Microsyringes (set of 4)
- Silicone septas (pk of 10)
- Silicone rubber tubing
- Pneumatic tube
- Thermocouple
- Power cable & communication cable
- User Manual



Sample Delivery Module



Stirrer Control unit



Electrolytic Titration Cell



Standard Reference Material for Chlorine
(2mg/l, 5mg/l, 10mg/l)



Pyrolyze quartz tube

ELEMEN+ CLS3000 Coulometric Chlorine Analyzer's Reagent and Auxiliary Accessories

Gases : High Purity O₂ above 99.95% (combustion)
High Purity N₂ or Ar 99.95% (Carrier)
Regulators for both gases

Computer & Software : Windows OS 10 (64 bit)

Chemicals : Pure Glacial Acetic Acid 99.9% ,
Ultrapure water

Standard specifications:

Parameters	Specifications
Model	ELEMEN+ CLS 3000 Chlorine Analyzer
Analysis Principle	Oxidation Pyrolysis/Coulometric Titration
Oxidation Decomposition	Quartz tube combustion method
Sample Type	Liquids, gases and solids
Sample Volume	Liquid Sample: 100ul or less, Solid Sample: 30mg or less
Testing Time	Less than 3 min per sample
Furnace	Horizontal Furnace up to 1100°C
Method of Detection	Oxidation-reduction potential
Detection Electrode for Cl	Silver electrode
Titration Control Method	Automatic control of electrolytic current
Bias voltage range:	0~500 mv, adjustable
Measuring range:	0.1~10000ppm (dilution for high concentration sample)
Temperature control:	Ambient to 1100°C, $\pm 1^\circ\text{C}$
Power supply:	AC 220V \pm 10V, 50/60Hz
Maximum power consumption:	3.5kW
Ambient temperature:	10 ~40°C
Relative humidity:	$\leq 85\%$
Dimension:	700 mm \times 480 mm \times 540mm (PC & Printer is not included)
Net weight:	46kg(PC is not included)



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