ELEMEN+

Good Value . Quality Performance

Achieve More & Measure with confidence

ELEMEN+ CLS6000 Coulometric Chlorine Analyzer

Easy to use Instrument Control, Data Acquisition & Reliable Analysis Results

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The **ELEMEN+CLS 6000** system is the latest model building on the success of the previous ELEMEN+ CLS3000 system. It uses micro coulometry technology and combined with its advanced software to provide accurate micro-coulometric titration. It comes with higher temperature capability (up to 1100°C) and can measure chlorine content in solid, liquid & gaseous phase down to low ppm level.

ELEMEN+ CLS6000 COULOMETRIC CHLORINE ANALYZER

Measuring Principle:

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

$$R\text{-}Cl + O_2 \longrightarrow HCl + CO_2 + H_2O$$

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 (either Argon or Nitrogen) will move the chloride ions into the titration cell. The chloride ions will react with silver ions as illustrated below,

$$Ag^+ + Cl^- \longrightarrow AgCl$$

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, as illustrated in the reactions:

$$HX + Ag^+ \longrightarrow H^+ + AgX, \quad Ag \longrightarrow Ag^+ + e$$

Coulometric Chlorine Analyzer
ELEMEN+ CLS 6000

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ELEMEN+ CLS6000 Coulometric Chlorine Analyzer

The ELEMEN+CLS 6000 prides itself with loads of features and benefits.

- Micro-coulometry technology. It is equipped with advanced yet simple to use 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 measuring capability. It can be upgraded 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 and chlorine in liquid, gas and solid material with respective accessories for different sample types.
- Absolute titration method. No calibration is needed. However, users can opt to perform calibration if they wish.
- High precision of PID regulation and control (± 1 °C)
- Over-temperature protection of cracking furnace with long service furnace lifespan

The ELEMEN+CLS 6000 features and benefits:

- Intuitive and user friendly software. It will perform straightforward parameter setting, data collection, processing, data storing and printing automatically. The simple software design allows even the most novice users to operate confidently within minutes.
- It needs less sample. Only 10ul for each run. The testing time is short, typical analysis can be completed in less than 3 minutes. For some samples, dilution is not necessary as well.
- Settable bias voltage for walk-away operation. Once the target bias voltage is set, system will automatically achieve the required bias voltage.
- The detector is equipped with independent temperature control, and the titration cell has good stability to maintain it at constant temperature.
- The detected gas can be discharged outdoors through a hose or into a distillation bottle for adsorption.

Measure with Confidence - ELEMEN+CLS 6000

The ELEMEN+ CLS6000 features reliability, robustness and stability in one compact footprint. It is widely use to analyze liquid and solid samples such as fuels, oils, minerals, used solvents, edible oil, waste water, chlorinated PVC, plastics, etc.

The system conforms to the following methods for chlorine testing:

- ASTM D5808-18
- ASTM D5808-09a
- ASTM 4929-2017
- ASTM D5194-96
- UOP779-08
- SY/T7508-1997
- SH/T1757-2006
- GB/T 18612-2001
- GB23971-2009 (appendix B)

Coulometric Chlorine Analyzer
ELEMEN+ CLS 6000

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CLS 6000 can be used in wide area of applications:


used oil


Chlorinated PVC & plastics


waste water


Petrochemical


Used solvents

The CLS6000 standard package includes:

- ELEMEN+ CLS6000 Chlorine Analyzer
- Sample Delivery Module (Liquid)
- Titration Cell & electrodes
- Quartz Tube for combustion
- Quartz boat for sample
- Standard reference material for Cl (2, 5, 10ppm)
- Microsyringes (set of 4)
- Silicone septa (pack of 10)
- Silicone rubber tubing
- Pneumatic Tube
- Thermocouple
- Concentrated H2SO4 drying filter
- Concentrated H2SO4 adsorption bottle rack
- Power & communication cable
- User Manual

The CLS6000 requires the following reagents and gases to operate:

- Combustion Gas - High purity O2 above 99.95%
- Carrier Gas - High purity N2 or Argon at 99.95%
- Gases regulators (for O2, N2/Ar)
- PC Workstation & Window OS (64 bit)
- Pure glacial Acetic Acid 99.9%
- Ultrapure water

Achieve More & Measure with confidence with
ELEMEN+ CLS6000 Coulometric Chlorine Analyzer

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Parameters	Specifications
Model	ELEMEN+ CLS6000 Chlorine Analyzer
Analysis Principle	Oxidation Pyrolysis/Coulometric Titration
Oxidation Decomposition	Quartz tube combustion method
Sample Type	Gas, Liquid & solid*
Sample Volume	Liquid sample: >100ul, solid sample >30mg
Testing Time	Less than 3 min/sample
Furnace/Furnace temp	Horizontal furnace, RT to 1100°C
Temp control accuracy	±1 °C
Detection Electrode for Cl	Silver electrode (Ag)
Titration Control Method	Automatic control of electrolytic current
Bias Voltage range	0 ~ 500mV, adjustable
Measuring range	0.1 ~ 10000ppm (dilution for high concentration sample)
Power Supply/consumption	AC 220V±10V, 50/60Hz, 3.5KW
Dimension/Weight	700 x 480x 540mm (WDH), 46kg

*changing quartz tube is required when run solid sample

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ELEMEN+ Series:

ELEMEN+ SUVF 3000 Sulfur Analyzer

ELEMEN+ CLS 3000 Coulometry Chlorine Analyzer

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