

Remarkable Accuracy  
with Absolute Precision



*XPLORER with ARCHIE and GLS*

## // XPLORER-TX/TS

Full application range with  
remarkable accuracy and precision

## Speed and Performance with Minimal Footprint

The XPLOER-TX/TS is a microcoulometric combustion analyzer for the analysis of total halogens and total sulfur. The small footprint allows it to blend into every laboratory environment, whether it is in R & D, refinery, chemical, or petroleum applications. This next generation analyzer surpasses all others in its class in performance. It is robust, precise and ideal for harsh testing environments.

The XPLOER-TX/TS was designed to offer standardized and customized solutions to match both current and future analytical needs.



*Configuration: XPLOER with GLS\**

## Key Features:

- Ultra-low detection limits, high stability and reliability due to the temperature controlled detectors and feedback control loop.
- A compact design with the smallest footprint in the market.
- Short start-up time. (Less than 15 minutes from standby mode).
- Fast and precise measurement of liquids, solids, and gases (including LPGs).
- Automation available for each type of measurement.
- Intuitive user interface and operational software.
- Complies with international standards like: ASTM, ISO, EN and IP.
- Full automation available with autosamplers.
- Easy generation of sample lists and application methods.
- Low maintenance due to optimized combustion and proper conditioning.



*ARCHIE with temperature controlled sample tray*

## Any Sample Matrix

The XPLOER-TX/TS combustion analyzer handles solid, liquid, gas and LPG samples. Changing from a liquids & gas module to the solids module has never been easier. With the push of one button, the liquids module retracts automatically from the heated zone. No clamps or manual locking. In under one minute, the system can be changed from the liquids mode to the solid mode. Simply choose the pre-loaded sample method and run.

## Automated or Semi-automated

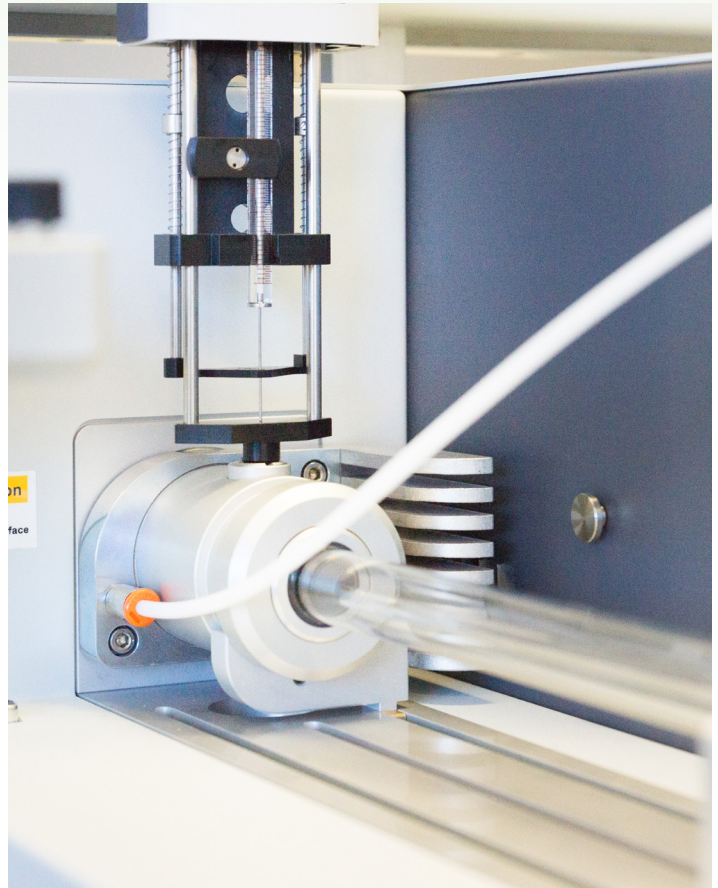
In terms of system automation, the choice is yours; semi automated or fully automated. Select between manual operation for a couple of samples per day or round the clock operation with the autosampler. If the analyzer is operated manually, there are two options. For the introduction of liquid samples, there is an integrated automatic syringe driver. It offers full control over the desired volume and speed of injection. For the introduction of solid samples, there is an integrated, software-controlled boat drive.

When operating the analyzer in full automation, the ARCHIE robotic autosampler handles all liquid samples from 10 to 105 to 210 positions. It extracts the samples from 2 mL vials and is able to dilute and generate calibration check standards automatically, as well as run routine samples. The GLS module is for the introduction of gas and LPG samples. Using the touch screen as the user interface, it can be operated as a method driven gas sampler and also as a stand-alone sample introduction unit.

Solid samples can be introduced by the stackable NEWTON autosampler, which simply utilizes gravity introduction for high sample throughput and low cost per analysis. Assorted sample cups are available for various applications. Working with an autosampler enhances the overall quality, saves time and significantly reduces the use of spare parts.

## Higher Confidence through Accurate Analysis

Coulometric determination of chlorine and sulfur is an absolute technique using the Faraday constant, so no calibration is required. The accuracy is automatically verified using a control standard. The analysis of hydrocarbons at ultra-low concentrations using these new, next-generation coulometers offers unprecedented precision.

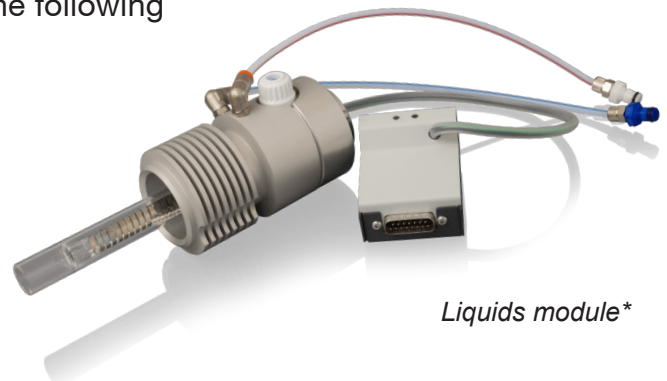


*Configuration: XPLORER with ARCHIE\**

## Compliance and Regulations

The instrument complies with, but is not limited to, the following international standards:

- |           |   |           |  |
|-----------|---|-----------|--|
| <b>TX</b> | <ul style="list-style-type: none"><li>• ASTM D4929</li><li>• ASTM D5194</li><li>• ASTM D5808</li><li>• ASTM D7457</li><li>• UOP 779</li></ul> | <b>TS</b> | <ul style="list-style-type: none"><li>• ASTM D3120</li><li>• ASTM D3246</li><li>• ASTM D3961</li></ul> |
|-----------|---|-----------|--|



*Liquids module\**



## Meeting the Toughest Standards and Regulations

Regulatory organizations worldwide have set low levels of allowed sulfur concentration in organic fuel for the present and near future. Besides sulfur regulations, knowing the exact concentration of sulfur and chlorine in certain feedstocks has always been important for production processes in the refineries. During the refinery process, organic chlorines combust and will form hydrochloric acid. This formation needs to be avoided to minimize corrosion in the refinery process. Therefore, the refineries need to monitor and control the total sulfur and total chlorine content in the crude oil feedstock.

## Auto Samplers

### GLS

*The next generation Gas & LPG sampling system*

The GLS is suitable for handling all types of pressurized gases and LPGs for the analysis of chlorine, nitrogen and sulfur. The GLS operates in tandem with the XPLOER combustion analyzer using the same software and can act as a stand-alone accessory with other combustion analyzers.

### ARCHIE

*The robotic liquids autosampler*

Unlike previous generation liquid samplers, the ARCHIE uses a 100  $\mu$ L syringe to aspirate and close the sample with utmost precision at a controlled speed. The sample can then be introduced into either a vertical liquid furnace module or be injected into a boat that can be driven into the furnace at a controlled rate, forming a perfect compliment to the XPLOER analyzer.

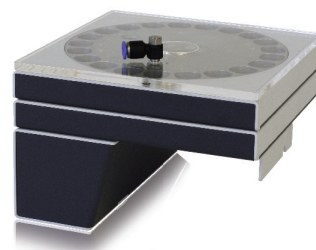
### NEWTON

*This autosampler measures up to 60 solid samples unattended*

The NEWTON is a stackable autosampler with housing trays for 20 samples. It is a simple, user-friendly system that is capable of running one, two or three trays of samples in succession unattended. After combustion is complete, the used empty quartz cups are retracted and stored in a stainless steel compartment ready for reuse.

## Reference Methodology

Microcoulometry is a reference method for the determination of total sulfur content in light liquid hydrocarbons, gasolines, diesels and their additives. It is also the reference method for the determination of total chlorides in crude oil. Microcoulometry fully complies with international standards: ASTM, ISO, IP, and UOP.





Chlorine Cell



Sulfur Cell

## How does the Chlorine Cell work?

Samples are introduced with the appropriate module, into a furnace, where the sample is oxidized at high temperature. The combustion gas, containing halide ions, is led into a sulfuric acid scrubber for rapid water and interferent removal. The dried and clean gas is led into the temperature controlled titration cell where the halide ions react with silver ions present in the titration cell.

The amount of charge (the integral of the regeneration current over the measuring time) used to regenerate the lost silver ions, is directly related to the halogen content of the sample.

### Combustion:



### Titration Cell:



## How does the Sulfur Cell work?

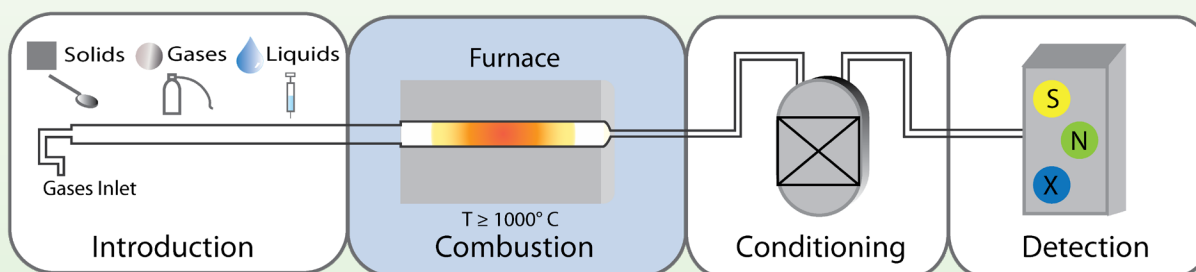
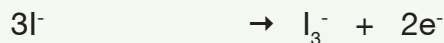
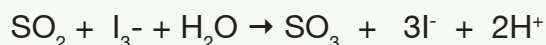
Samples are introduced with the appropriate module, into a furnace, where the sample is oxidized at high temperature. The combustion gas, containing sulfur dioxide ( $SO_2$ ), is led into a sulfuric acid scrubber for rapid water and interferent removal. The dried and clean gas is led into the temperature controlled titration cell where the sulfur dioxide reacts with triiodide present in the titration cell.

The amount of charge (the integral of the regeneration current over the measuring time) used to regenerate the lost triiodide, is directly related to the sulfur content of the sample.

### Combustion:



### Titration cell:



## XPLOER-TX/TS System Specifications

Dimensions (W x H x D)	36 x 27.2 x 69 cm (14.2 x 10.7 x 27.2 in.)
Weight	27 kg (59.5 lbs) without furnace tube and introduction module
Voltage	100-240 V, 50-60 hz
Power Requirement (maximum)	1.15 KW
Gas Connectors	1/8" Swagelok
Gases Required	Oxygen 99.6% (2.6), Argon 99.998% (4.8) or Helium 99.99%
Input Gas Pressure	3-10 bar (45-145 PSI)
Internal Gas Pressure	1.8 bar, adjustable
Furnace Voltage	Dual zone, low voltage
Furnace Temperature (maximum)	1150 °C (2102 °F)
Furnace Cooling	Pulling fan with auto control
Sample Introduction	Quartz boats, microliter syringe, and gas sampling system
Sample Size	Solids 5-1000 mg, Liquid syringeable injection up to 100 uL, Gas 10 mL, and LPG 100 uL
Boat Driver	Software controlled, adjustable
Slider/Shutter Driver	Software controlled, adjustable
Detector	SMD, Digital coulometer
Detector Accuracy	Better than 2% CV
Titration Cell Conditioning	Temperature controlled, adjustable
Software	dot.NET-based
Ambient Temperature	5-35 °C (41-95 °F) non-condensing

## Industrial Applications

### Chemicals

- Acetic Acid
- Polypropylene and Ethylene
- Polycarbonate
- Aromatics
- Resins
- Olefins and Parafines

### Refinery Products

- Crude Oil
- Kerosene
- Diesel and Fuel Oils
- Gases and LPGs
- Lubricants
- Gasoline
- Catalyst
- Naptha

### Solution provider for the following

- Independant laboratories
- Chemical laboratories
- Petrochemical laboratories
- Government institutions and research facilities
- Universities



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### HORIBA INSTRUMENTS, INC.

9755 Research Drive  
Irvine, California 92618  
800-446-7422

[www.horiba.com](http://www.horiba.com)  
[labinfo@horiba.com](mailto:labinfo@horiba.com)

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