

## // XPLORER-TX/TS

Full application range with remarkable accuracy and precision



## Speed & 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, a refinery, a chemical or petrochemical application. This elemental analyzer will perform well. It is robust, precise and ideal for harsh testing environments.



*Configuration: XPLOER with GLS\**

### Key Features Include:

- Ultra-low detection limits, high stability and reliability due to the temperature controlled detectors and feedback control loop.
- 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.
- Simultaneous analysis of halogens and sulfur.
- Fast and easy switching between modules, resulting in high productivity.
- Complies with international standards like: ASTM, ISO, EN and IP.
- Fully automated creation of calibration curves from a single stock solution with the optional ARCHIE autosampler.
- Fast generation of sample lists and application methods.
- Low maintenance due to optimized combustion and the proper conditioning of the produced gases.



Solid samples can be introduced by the stackable NEWTON auto sampler, 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 auto sampler enhances the overall quality, saves time and significantly reduces the use of spare parts.

## Higher Productivity through Accurate Analysis

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

## Compliance and Regulations

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

*Archie*

## Any Sample Matrix

The XPLORER-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 & gas module retracts automatically from the furnace. No clamps or manual locking. The change can be made in less than a minute. Simply choose the pre-loaded sample calibration list and run your samples.

## Automated or Semi-automated

In terms of system automation, the choice is yours; semiautomated 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 XYZ auto sampler handles all liquid samples from 105 up 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.

TX	ASTM D4929
	ASTM D5194
	ASTM D5808
	ASTM D7457
	UOP 779
TS	ASTM D3120
	ASTM D3246
	ASTM D3961



## Industrial Applications

### Chemicals

- Acetic Acid
- Polypropylene & ethylene
- Polycarbonate
- Aromatics
- Resins
- Olefins and parafines

### Refinery Products

- Crude oil
- Kerosene
- Fuel oil
- Gasoline
- Diesel fuels
- Catalyst
- Naptha
- Lubricants

### Gases and LPGs

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

## 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 and sulfur. The GLS combines seamlessly with the XPLOER combustion analyzer using the same software, and is also excellent with other combustion analyzers.

### ARCHIE

*The robotic liquids auto sampler*

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

### NEWTON

*This auto sampler measures up to 60 solid samples unattended*

The NEWTON is a stackable auto sampler. Housing trays for 20 samples, it is designed for a quick, accurate introduction of solid samples into the XPLOER. It is a user friendly system that is capable of running one, two or three trays of samples in succession unattended. The clean cups which are retracted from the combustion zone, are stored in a stainless steel compartment ready to be reused.

## 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 feed stocks 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.

## Reference Methodology

Microcoulometry is a reference method for the determination of total sulfur content in light liquid hydrocarbons, gasoline, 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 a 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?

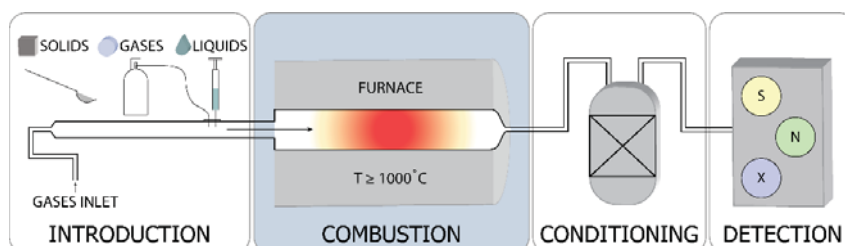
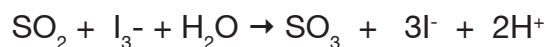
Samples are introduced, with the appropriate module, into a furnace, where the sample is oxidized at high temperature. The combustion gas, containing sulfur dioxide (SO<sub>2</sub>), is led into a sulfuric acid scrubber for rapid water and interferent removal. The dried and clean gas is led into the temperature controlled titration cell, where the sulfur dioxide reacts with Tri-iodine, present in the titration cell.

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

*Combustion:*



*Titration cell:*



## XPLORER-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)	1.15KW
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 boat
Solids	5-1000 mg
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



Please read the operation manual before using this product to assure safe and proper usage of the product.

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