Trace Elemental
Instruments

Configuration: XPLORER with ARCHIE*

// XPLORER-TX/TS

Full aplication range with remarkable accuracy and precision.

The TE Instruments XPLORER-TX/TS is a microcoulometric combustion analyzer for the analysis of Total Halogens and Total Sulfur.

The XPLORER-TX/TS blends into every laboratory environment, whether it is for R&D, refinery, chemical or petrochemical applications, this elemental analyzer handles them all without any exception.
Its robustness and precision are ideal for activities in, for example, refineries or surveyor testing labs.

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Speed & Performance with minimal footprint

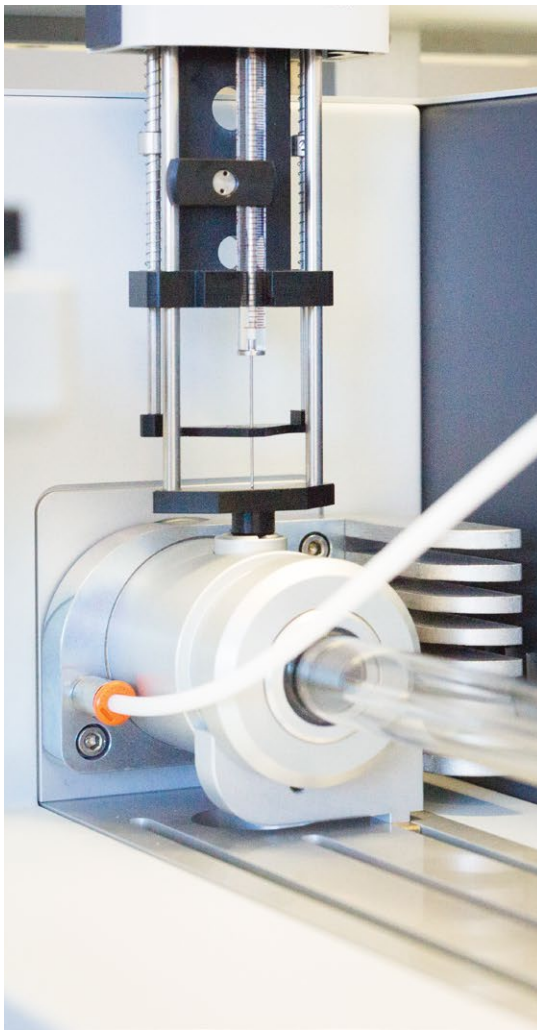
Configuration: XPLORER with ARCHIE and GLS*

Key features include:

- Compact design, smallest footprint in today's market
- Fast generation of sample queues and application methods with TE Instruments software (TEIS)
- Short start-up time (less than 15 minutes)
- Fast and precise measurement of solids, liquids, gases and LPG's
- Easy to use and intuitive user interface
- Compact, stackable auto sampler for high sample throughput and low cost per analysis
- Ultra low detection limit, high stability and reliability due to the temperature controlled titration cell
- Fast and easy switching between TX and TS analysis, resulting in high productivity
- ASTM, ISO, IP and related international standards compliance
- Low maintenance and cost-effective, optimal combustion and conditioning of gases results in near to zero downtime

Configuration: XPLORER with manual liquids module*

Configuration: XPLORER with NEWTON*



Configuration: XPLORER with ARCHIE*

Anything goes

The XPLORER-TX/TS combustion analyzer handles solid, liquid, gas and LPG samples. Changing from the liquids & gas module to the solids module has never been easier. Just push one button and the liquids & gas module retracts automatically from the hot area. No clamps or manual locking! It will take about 45 seconds to change from the liquids & gas module to the solids mode. Simply choose the pre-loaded sample list and run your samples.

Manual or robotics

You can choose how you want to measure your samples: manually or automated. Just a couple of samples per day or round the clock operation. 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. Both features do come standard with every XPLORER-TX/TS.

If the analyzer operates 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 standards automatically.

For the introduction of Gas and LPG samples, we introduced the GLS auto sampler. It can run as a stand-alone, method driven, gas sampler, using a touch screen as user interface. Connected to the powerful TEIS software it simply runs in slave mode to the XPLORER-TX/TS.

The introduction of solid samples can be executed by the stackable Newton auto sampler, which simply utilizes the law of gravity, for high sample throughput and low cost per analysis. Various sample cups are available for all kinds of applications.

Working with an auto sampler enhances the overall quality, saves time and significantly reduces the need for spare parts.

Spot-on analysis, higher productivity

Coulometric determination of Chlorine and Sulfur is an absolute technique and calibrating the analyzer is not a requirement.

The accuracy is automatically verified using a control standard. The overall analysis of hydrocarbons at ultra-low concentrations has an unprecedented precision of 1.5%.

The XPLORER-TX/TS has it all.

Compliance and regulations

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

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

For a complete overview of regulations & compliance, please visit:
http://www.teinstruments.com/regulations

TE Instruments analytical software (TEIS):

Ensuring intuitive and smooth control of your analysis. The user interface of the TE Instruments Software (TEIS) hardly needs any explanation. Its simplicity ensures smooth operation of the XPLORER-series, with intuitive controls and operation features. TEIS assists the user to achieve routine analyses in an efficient, fast and reliable way. Instrument operation remains simple. This resourceful software makes it possible to modify sample lists, evaluate data and calibration lines, completely independent. Results can be presented in customized print reports or exported in a variety of data formats. Sensor readings and generated log files helps the user to handle daily matters and plan a service intervention ahead in time. No suprises!

FEATURES

One software solution for all TEI analyzers
Real time measurement curves
Multi-Elemental analysis
Selectable user and service levels
Customized applications and analysis methods
Fully multi-tasking

BENEFITS

Reduces complexity and improves productivity
Maximum analysis control, compare samples at a glimpse
Optimal analysis control and time saving procedure
Security and data integrity
Full and flexible control of the analysis/system
Efficient, user friendly and time saving

Meeting the toughest standards and Regulations

Regulating bodies all over the world have set challenging low levels of allowed sulfur concentration in organic fuels for the present and near future. Besides the regulations for sulfur, knowing the exact concentration of sulfur and chlorine in certain feeds has always been important for the production processes in refineries. For example: during the refinery process organic chlorines will form hydrochloric acid, this formation need to be avoided to minimize corrosion in the refinery process. Hence, the refineries need to monitor and control the total Sulfur and total Chlorine content in the feedstock.

Reference methodology

Microcoulometry is the reference method for the determination of total sulfur content in light liquid hydrocarbons, gasoline, diesels and their additives; and the reference method for the determination of total chlorine in crude oil. The methodology fully complies with the international standards: ASTM, ISO, IP, UOP, etc.

Industrial applications

Chemicals:

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

Refinery products:

- Crude oil
- Kerosene
- Fuel oil
- Gasoline
- Diesel fuel
- Catalyst
- Naphta
- Lubricants

LPG and gases

Solution provider for the following industries:

- Surveyor laboratories
- Chemical laboratories
- Petrochemical laboratories
- Governmental Institutes and Research Facilities
- Universities

CHLORINE CELL

SULFUR CELL

How does it work?

Samples are introduced, with the appropriate introduction module, into a furnace, where they are oxidized at high temperature.
The combustion gas, carrying halide ions, is led into a sulfuric acid scrubber for rapid water and interference 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:

$R\text{-}X + O_2 \longrightarrow HX + CO_2 + H_2O$

TITRATION CELL:

$HX + Ag^+ \longrightarrow H^+ + AgX$

$Ag \longrightarrow Ag^+ + e$

How does it work?

Samples are introduced, with the appropriate introduction module, into a furnace, where they are oxidized at high temperature.
The combustion gas, carrying Sulfur dioxide (SO_2), is led into a sulfuric acid scrubber for rapid water and interference 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:

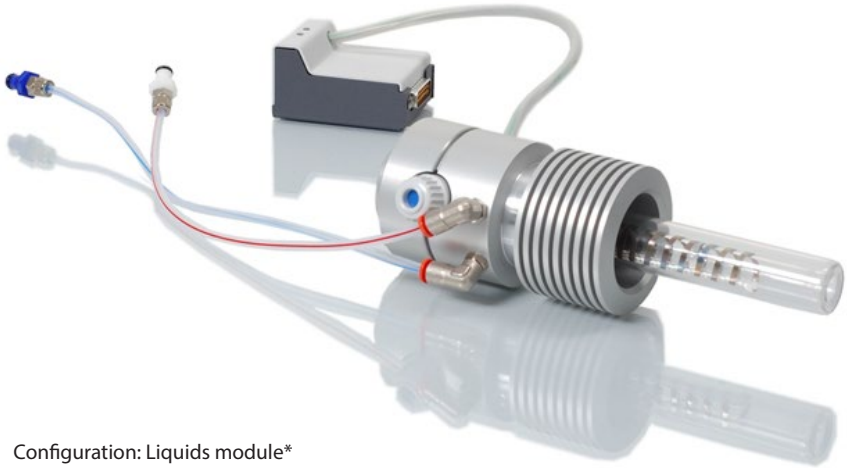
$R\text{-}S + O_2 \longrightarrow SO_2 + CO_2 + H_2O$

TITRATION CELL:

$SO_2 + I_3^- + H_2O \longrightarrow SO_4^{2-} + 3\ I^- + 4\ H_3O^+$

$2\ I^- \longrightarrow I_2 + 2\ e$

$I_2 + I^- \longrightarrow I_3^-$



Configuration: Liquids module*

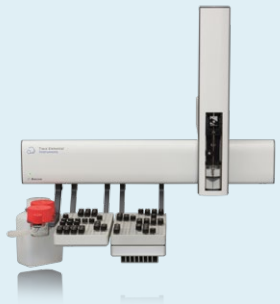
Option: GLS auto sampler

auto sampler GLS*

The next generation Gas & LPG sampling system.

TE Instruments has developed the **GLS**, suitable for handling all sorts of gases and LPG's for the analysis of Total Chlorine, Nitrogen and Sulfur.
The **GLS** combines excellent with the **XPLORER** combustion analyzer, but also does an excellent job as a stand-alone gas and LPG auto sampler with any other combustion analyzer.

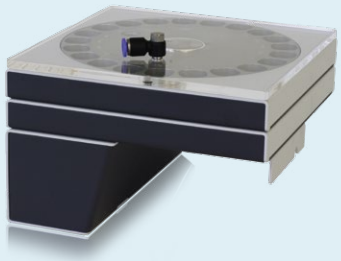
Option: ARCHIE auto sampler


auto sampler ARCHIE*

TE Instruments is proud to introduce our robotic liquids auto sampler, ARCHIE.

Unlike previous generation liquids samplers, the **ARCHIE** uses a 100 µL syringe to inject the sample with utmost precision into a vertical liquids, or boat introduction module at controlled speed, forming a perfect match with the **XPLORER** analyzer.

Option: NEWTON auto sampler


auto sampler NEWTON*

NEWTON auto sampler, for absolute sample control, measuring up to 60 samples unattended.

TE Instruments **NEWTON** is a stackable solids auto sampler, designed for accurate and fast introduction of samples into the **XPLORER**. It is a simple and user friendly system capable of running 20, 40 or 60 samples in a row unattended!

XPLORER system specifications

Dimensions (W x H x D)	36 x 27.2 x 69 cm (14.2 x 10.7 x 27.2 inch)
Weight	27kg (59.5 lbs)
Voltage	100-240 V, 50-60 Hz
Power requirement (max)	1150 W
Gas connector	⅛" Swagelok
Gases	Oxygen 99.6 % (2.6), Argon 99.998 % (4.8)
Input gas pressure	3-10 bar
Internal gas pressure	1.8 bar, adjustable
Furnace voltage	Dual zone, low voltage
Furnace temp. (max)	1150 °C (2102 °F)
Furnace cooling	Pulling fan, auto control
Sample introduction AOX/TOX:	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, TEIS software
Ambient temperature	5-35 °C (41-95 °F) non condensing

*Used images are examples of configurations which may deviate from ordered configurations.