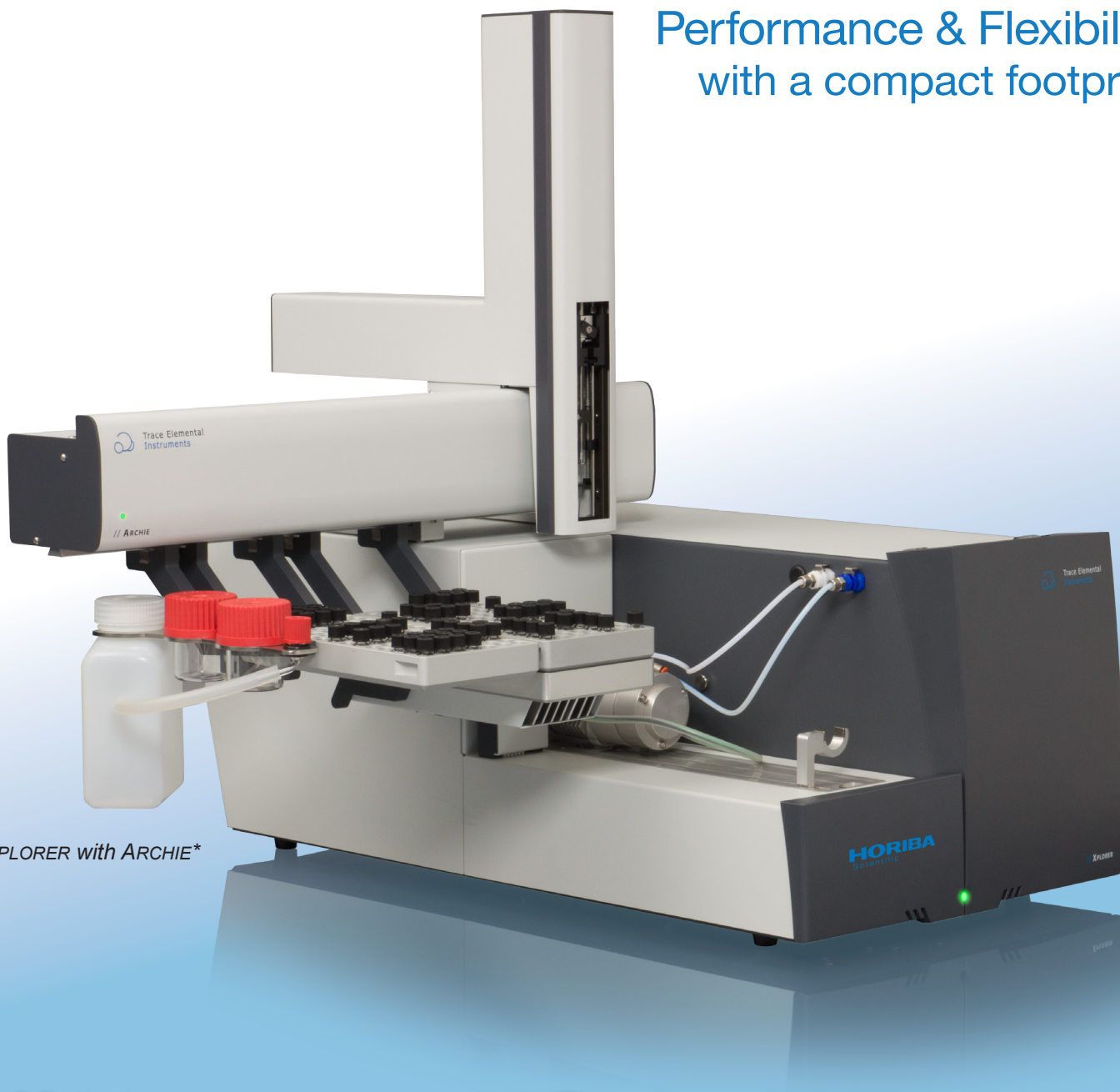


Performance & Flexibility  
with a compact footprint



*XPLORER with ARCHIE\**

# // XPLORER-NS

Total Nitrogen and Sulfur Analyzer



*XPLORER with ARCHIE\**

## High Performance and High Throughput from a Small Footprint

The XPLORER-NS was developed as a total nitrogen/total sulfur combustion analyzer, capable of handling fully automated applications for liquids, solids, and gases (including LPG samples.) Changing from the liquids & gas module to the solids module has never been easier. Just push one button and the liquids module is automatically retracted from the heated zone. No clamps or manual locks required.

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.

The XPLORER-NS was designed to offer standardized and customized solutions to match both current and future analytical needs, ranging from low ppb's to high ppm's.

### Key Features:

- Ultra-low detection limit, 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.
- Easy to use and intuitive user interface and operational software.
- Simultaneous analysis of nitrogen & 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.
- Fast generation of sample lists and application methods.
- Low maintenance due to optimal combustion and the proper conditioning of the resulting gases produces near zero downtime.



*Configuration: XPLORER with GLS\**

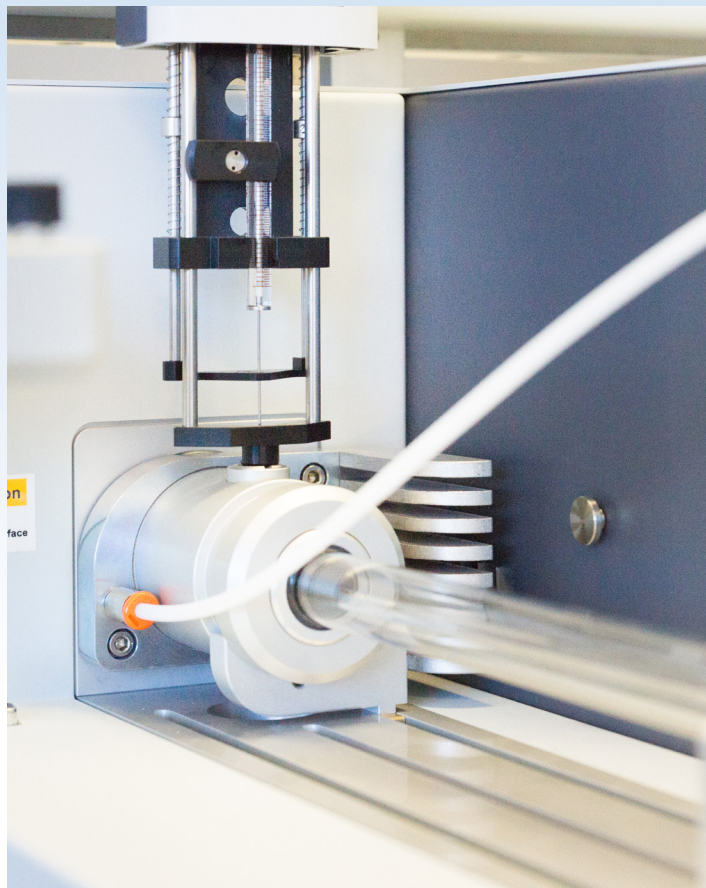
## Manual or Robotic

Choose how the XPLOER measures your samples; manually or automated. Just a few samples per day or round the clock operation can be handled.

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 speed of injection. For the introduction of solid samples, there is an integrated automatic syringe driver, software-controlled boat drive. Both features come standard with every XPLOER-NS.

If the analyzer is operated with full unattended automation, the robotic XYZ auto sampler, the ARCHIE, handles all liquid samples from 105 to 210 positions. It extracts the samples from standard 2 mL vials to dilute and can generate calibration standards automatically. Optional sample trays are available which feature heating for higher boiling samples and cooling for more volatile samples.

For the introduction of gas and LPG samples there is the GLS auto sampler. It can also be run as a stand-alone, method driven, gas sampler, using a touch screen as the user interface. The introduction of solid samples can be executed by the stackable NEWTON auto sampler, which simply utilizes gravity, for high sample throughput and low cost per analysis. Various sample cups are available for all types of applications.



Configuration: XPLOER with ARCHIE\*

Working with an auto sampler enhances the overall data quality for consistent, repeatable sample introduction without operator interaction and saves time.

## Compliance and Regulations

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

### Total Sulfur

- ASTM D5453
- ASTM D6667
- ASTM D7183
- EN 20846

### Total Nitrogen

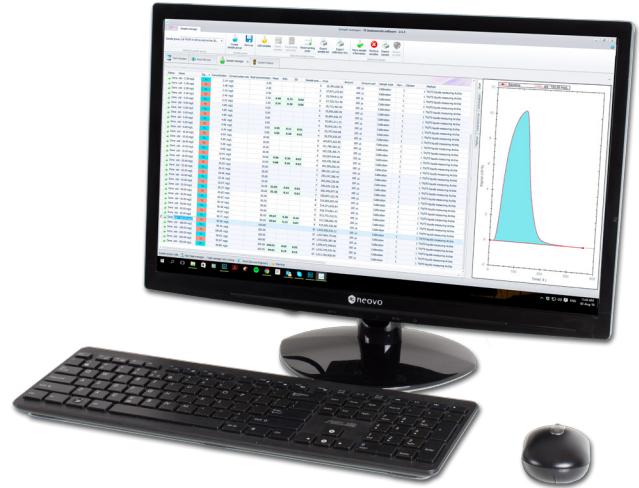
- ASTM D4629
- ASTM D5762
- ASTM D6069
- ASTM D7184



Liquids module\*

## TE Instruments Analytical Software (TEIS):

Ensuring intuitive and smooth control of the analysis is a top priority. The user interface of the TE Instruments Software (TEIS) requires no explanation. TEIS assists the user to achieve routine analyses in an efficient, fast and reliable way. The intelligent software makes it possible to modify sample lists, evaluate data files and calibration curves, completely independently. Results can be presented in customized printed reports or exported in a variety of data formats to other programs. Data may be recalculated with the use of a new calibration curve. Sensor readings and log files help the user to monitor operation and to plan service intervention ahead of time.



### Features:

- One software solution for all TEI analyzers
- Real-time measurement curves
- Multi-elemental analysis
- Selectable user and service operation modes
- Customized applications & analysis methods
- Fully multi-tasking capability
- Standard 5-year warranty

### Benefits:

- Reduces complexity and improves productivity
- Maximum analysis control compares sample results at a glance
- Optimal analysis control for time saving procedures
- Security and data integrity
- Full and flexible control of the analysis/system
- Efficient and user friendly software resulting in time savings

## Meeting the Toughest Standards and Regulations

Regulatory bodies all over the world have set challenging low levels of allowable sulfur concentration in motor fuels for the present and future. Besides lower sulfur levels, the nitrogen content in fuels is attracting a lot of attention. Knowing the exact concentration of sulfur and nitrogen in certain feed streams has always been very important for the production processes in refineries. For example: catalysts in refinery processes lose their efficiency because of catalyst poisoning. The most prevalent compounds blamed are nitrogen and sulfur. Therefore, refineries need to monitor and control nitrogen and sulfur content in their feedstock. This is the only way to tune the fuel blending processes with the highest degree of efficiency and accuracy.

## Reference Methodology

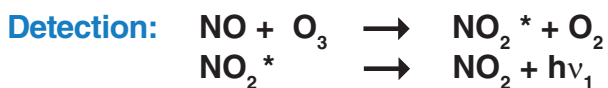
The XPLOER-NS measures nitrogen and sulfur simultaneously creating valuable information about the sample in a single injection. With the low detection limits, it is possible to measure both nitrogen and sulfur concentrations at ppb levels. Sample combustion at high temperature with chemiluminescence and UV-fluorescence detection are reference methods for the determination of nitrogen and sulfur.

The methodology fully complies with established international standards, such as ASTM, ISO & IP.

## Combustion: $R-SN + O_2 \rightarrow NO + SO_2 + CO_2 + H_2O$

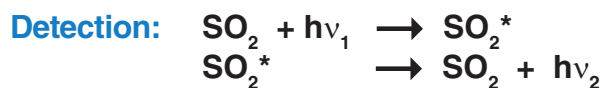
### Nitrogen detection:

Electrically generated ozone is added to the nitric oxide to form nitrogen dioxide ( $NO_2^*$ ) in an excited state. The  $NO_2$  emits light as it reverts to a lower energy state. The emitted light is detected by a Photomultiplier Tube (PMT). The amount of emitted light is proportional to the amount of  $NO$ . This, in turn, corresponds to the amount of nitrogen present in the original sample.



### Sulfur detection:

Sulfur is measured by pulsed UV-fluorescence excitation of sulfur dioxide ( $SO_2$ ) formed during the oxidation step. After excitation, the meta-stable  $SO_2$  instantly decays and drops back to the ground state energy level. During this process, UV light is emitted. As this excitation light has a different wavelength than the original UV, the photomultiplier tube is able to detect only this emission. The amount of light emitted corresponds to the total amount of  $SO_2$  present in gas stream. This, in turn, represents the total amount of sulfur in the original sample.



## 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 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*

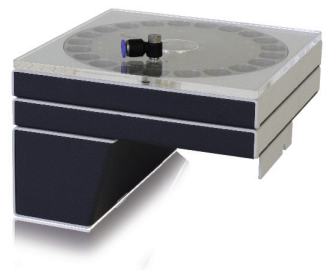
Unlike previous generation liquid samplers, the ARCHIE uses a 100  $\mu$ L syringe to aspirate and close the sample with utmost precision and at a controlled speed. The sample can then be injected into a vertical liquid or moved in a boat introduction module at controlled speed, forming a perfect complement 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 samples into the XPLOER. It is a simple, user friendly system that is capable of running one, two or three trays of samples in succession unattended. The clean cups are retracted from the combustion zone and stored in a stainless steel compartment, ready to be reused.



# XPLORER-NS System Specifications

Dimensions (width x height x depth)	36 x 27.2 x 69 cm (14.2 x 10.7 x 27.2 in.)
Weight	32 kg (70.5 lbs) without furnace tube and introduction module
Voltage	100-240 V, 50-60 hz
Power requirement (max)	1.15KW
Gas Connectors	1/8" Swagelok
Gases required	Oxygen 99.6%, Argon 99.998% 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 (max)	1150 °C (2102 °F)
Furnace cooling	Pulling fan with auto control
Sample introduction	Solid or liquid by boat, Liquid by direct injection, Gases and LPGs by GLS
Sample size	Solids: 5-1000 mg; Liquids: 100 µL; Gas; 10 ml; LPG; 100 µL
Semi-automatic boat/syringe driver	Software controlled, programmable method file
Slider/shutter driver	Software controlled
Detector Nitrogen	Chemiluminescence
Detector Sulfur	Xenon pulsed UV-fluorescence AFC Technology
Detector accuracy	Better than 2% CV
Detector conditioning	Temperature controlled, adjustable
Vacuum pump	Internal 24 volt DC
Software	dot.NET-based, TEIS software
Ambient temperature	5-35 °C (41-95 °F) noncondensing

## Industrial Applications

### Chemicals

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

### Refinery Products

- Kerosene
- Fuel Oil
- Gasoline
- Diesel Fuels
- Catalyst
- Naptha / Reformer Feeds
- Lubricants

### Solution provider for the following

- Fuel inspection laboratories
- Chemical laboratories
- Petroleum laboratories
- Regulatory agencies
- Universities

### Gases and LPGs



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