Trace Elemental
Instruments

// XPLORER-NS

Full range Total Nitrogen, Total Sulfur instrument for the modern Laboratory.

TE Instruments has developed the Xplorer-NS, a Total Nitrogen and Total Sulfur combustion analyzer, offering fast, accurate and precise analysis of liquids, LPG's, gas and solids. This brand new model is designed to offer standardized and customized solutions to match both current and future analytical needs, ranging from low ppb's to high ppm's.

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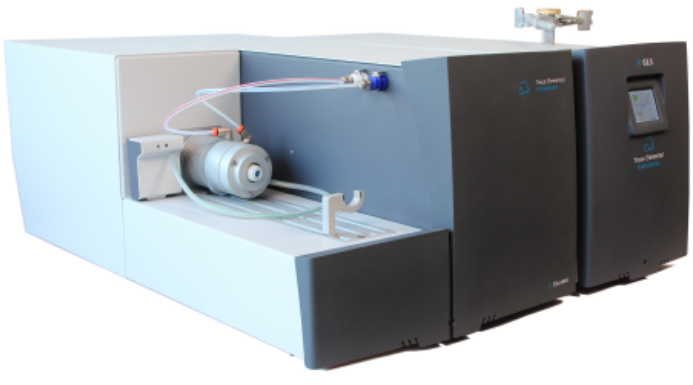
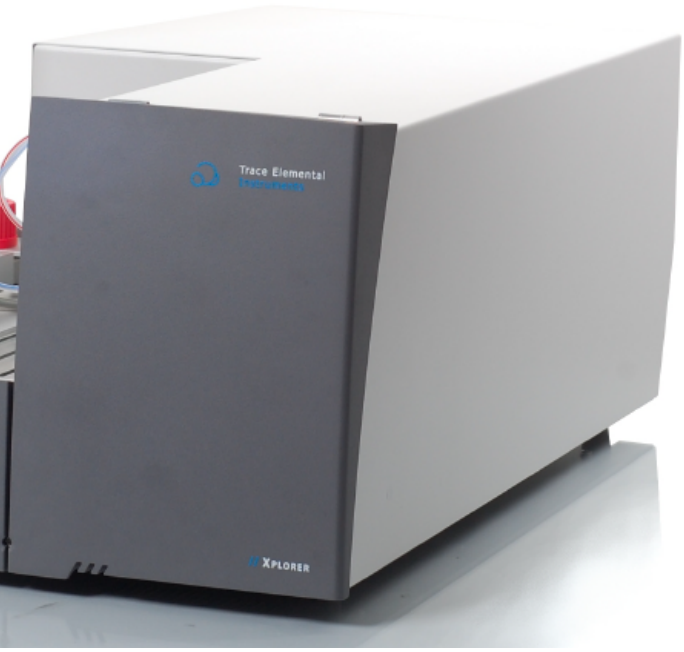
Speed & Performance with minimal footprint

Key features include:

- Compact design
- Fast generation of sample queues and appplication methods with TE Instruments software (TEIS)
- Short start-up time (less than 15 minutes)
- Fast an precise measurement of solids, liquids, LPG's and gas
- Easy to use and intuitive user interface
- Simultaneous analysis of Nitrogen and Sulfur
- Optional, compact, stackable solids auto sampler for high sample throughput and low cost per analysis
- Optional 105 positions, 2ml vial XYZ auto sampler for liquid samples, auto dilution, auto calibration standards generation
- Optional gas and LPG auto sampler
- Ultra low detection limit, high stability and reliability due to the temperature controlled detectors and feedback loop
- Low maintenance, optimal combustion and conditioning of gases results in near to zero downtime
- Fast and easy switching between modules, resulting in high productivity
- ASTM, ISO, IP and related international standards compliance





High Performance and High Throughput out of a small footprint

The Xplorer series is capable of handling all sorts of samples and applications.
The TN/TS combustion analyzer handles liquids, solids, liquefied gas and gas samples.
Changing from the liquids & gas mode to solids was never easier. Just push one button and the liquids & gas module is automatically retracted from the hot area. No clamps or manual locking.
It will take about 45 seconds to change into the solids mode. Simply choose the pre-loaded sample list and run.

Manual or Robotics

There is still a choice as to how you'd like to run your samples. 24/7 or just a couple of samples a day.
For manual liquids there is an integrated automatic syringe driver. It offers full control over the desired volume and speed of injection.
For manual solids introduction, there is an integrated software contolled boat drive.
Both features do come standard with every Xplorer.

If the choice is full automation, a robotic XYZ auto sampler, ARCHIE-105, handles all liquids. The ARCHIE-105 allows direct injection either by boat or vaporizer.

For LPG's and Gas there is a revolutionary, fully automated sampler, GLS.
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. Just run your sample list and the liquefied gas or gas sampling is in full control

Automatic handling of solid samples can be executed by the NEWTON 20 auto sampler. It handles sample cups for various applications.
No matter what choice you make: every bench marking design feature, enhances the overall quality, saves time and significantly reduces the need for spare parts.

Compliance and Regulations

Our instruments comply with the following international standards for:

Total Sulfur	ASTM D5453
	ASTM D6667
	ASTM D7183
	ASTM D7184
Total Nitrogen	ASTM D4629
	ASTM D5762
	ASTM D6069

No future without sustainability...

Meeting the toughest Standards and Regulations

Regulatory bodies all over the world have set challenging low levels of allowed Sulfur concentration in organic fuels for the present and near future. Beside Sulfur, the Nitrogen content in fuels is attracting a lot of attention, in order to protect the environment.
Knowing the exact concentration of Sulfur and Nitrogen in a certain feeds, has always been very important for the production processes in the refineries. For example: catalysts in refinery processes lose their efficiency by catalyst poisoning. Main compounds to blame are Sulfur and Nitrogen.
Hence, refineries need to monitor and control the Total Nitrogen and Total Sulfur content in the feedstock. This is the only way to tune the processes at the highest stage of efficiency.

Reference Methodology

The Xplorer-NS measures Sulfur and Nitrogen simultaneously, creating valuable information about the sample in a single run. With its low detection limit it is possible to measure the Total Nitrogen and Total Sulfur concentrations at low ppb level.
Sample combustion at high temperature and chemiluminescence- and UV-fluorescence detection are reference methods for the determination of Total Nitrogen and Total Sulfur.
The methodology fully complies with the international standards, like ASTM, ISO, IP, 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

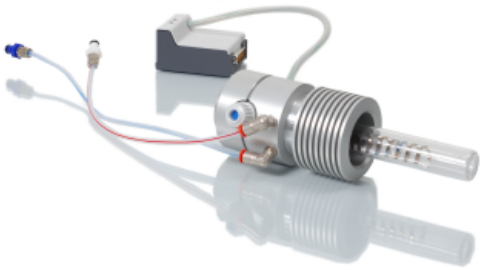
LPG and gases

Solution provider for the following industries:

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

How does it work?

Samples are introduced, with the appropriate introduction module, into a furnace, where they are oxidized. After a complete combustion, nitric oxide (NO) and Sulfur dioxide (SO_2) are formed and led into the serial connected reaction chambers after the water has been removed.



COMBUSTION

$$R\text{-}SN + O_2 \longrightarrow NO + SO_2 + H_2O + CO_2$$

Nitrogen detection:

Added electronically generated ozone reacts with the nitric oxide, and nitrogen dioxide in an excited state (NO_2^*) is formed in the reaction chamber. The excited NO_2 luminesces light as it reverts to a lower energy state. The emitted light is detected by a Photomultiplier Tube (PMT).
The amount of detected emitted light, corresponds with the amount of NO. This in turn represents the amount of total nitrogen present in the sample.

DETECTION:

$$NO + O_3 \longrightarrow NO_2^* + O_2$$

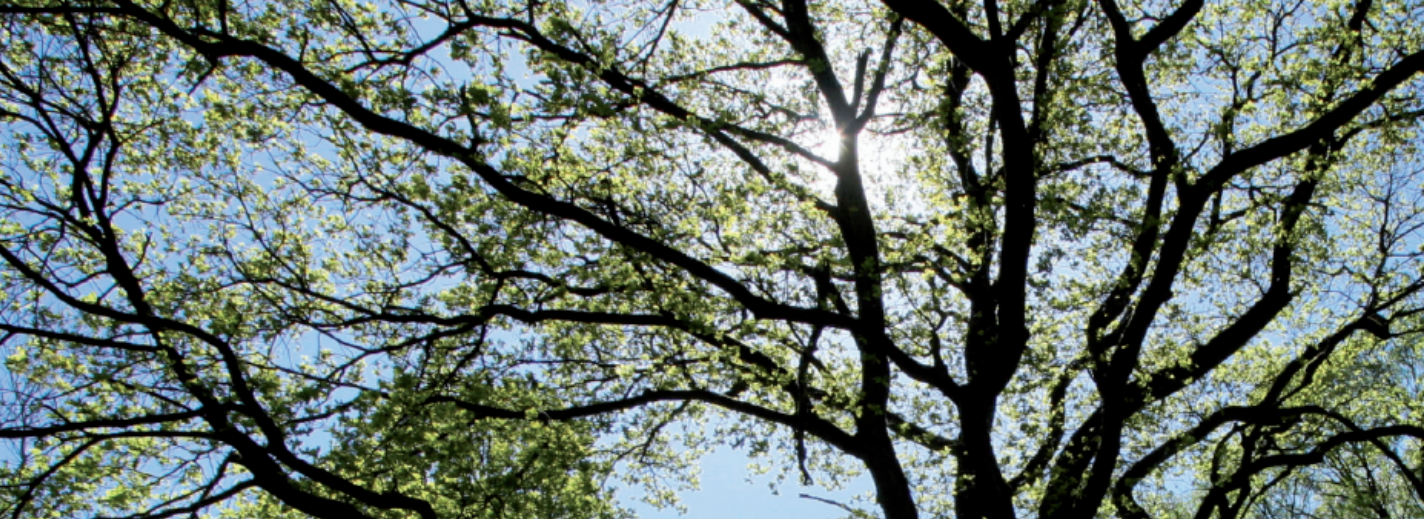
$$NO_2^* \longrightarrow NO_2 + h\nu_1$$

Sulfur detection:

Sulfur is measured by pulsed UV-fluorescence. Sulfur dioxide (SO_2) is formed during the oxidation and is transferred to the reaction chamber. Here it is excited by a pulsed UV source and as the excited state is unstable, the excited SO_2 instantly decays to its ground state energy level. During this process, UV light is emitted. As this light has a different wavelength than the original UV source, the photomultiplier tube is able to detect this emission. The amount of light emitted reflects the total amount of SO_2 present in the gas, which in turn corresponds to the total amount of sulfur in the sample.

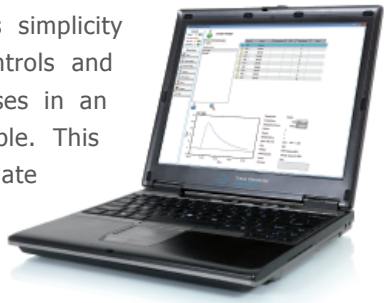
DETECTION:

$$SO_2 + h\nu_1 \longrightarrow SO_2^* \qquad SO_2 + h\nu_2$$



...it all starts with clean water.

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 queues, 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 help the user to handle daily matters and plan service intervention ahead in time. No suprises!

FEATURES	BENEFITS
One software solution for all TEI analyzers	Reduces complexity and improves productivity
Real time measurement curves	Maximal analysis control, compare samples at a glimpse
Multi-Elemental analysis	Optimal analysis control and time saving procedure
Selectable user and service levels	Security and data integrity
Customized application and analysis methods	Full and flexible control of the analysis/system
Fully multi-tasking	Efficient, user friendly and time saving

XPLORER System Specification

Dimensions (W x H x D)	40 x 28 x 70cm (15.7 x 11 x 27.6 inch)
Weight	34kg (74,8lbs)
Voltage	100-240 V, 50-60 Hz
Power requirement (max)	1150 W
Gas connector	1/8" Swagelok
Gases	Oxygen 99.6 % (2.6), Argon 99.998 % (4.8)
Input gas pressure	2-10 bar
Internal gas pressure	1.8 bar, adjustable
Furnace voltage	Dual zone, low voltage
Furnace temp. (max)	>1200 °C (2192 °F)
Furnace cooling	Pulling Fan, auto control
Sample introduction:	Liquids direct injection, Solids by boat, Gas by GLS module
Sample size:	Liquids: 100µl; Solids: 5-1000mg; LPG: 100µl loop; Gas: 10ml loop
Semi-automatice boat/syringe driver:	Software controlled, adjustable method file
Slider/shutter driver	Software controlled, adjustable
Detector Sulfur	Xenon Pulsed UV-fluorescence AFC technology
Detector Nitrogen	Chemiluminescence
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)