Trace Elemental Instruments

Configuration: Xplorer with Vectra and GLS*

// 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 solids, liquids, gases and LPGs. This compact and robust 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

Configuration: Xplorer with Newton*

Key Features Include:

- Compact design, smallest footprint in today's market.
- Short start-up time (less than 15 minutes).
- Fast and precise measurement of solids, liquids, gases and LPGs.
- Easy to use and intuitive user interface, operation software.
- Simultaneous analysis of Nitrogen and Sulfur.
- Fast and easy switching between modules, resulting in high productivity.
- Complies with international standards like: ASTM, ISO, and UOP.
- Easy upgrades with autosamplers for solids, liquids, gases and LPGs.
- Fully automated creation of calibration lines from a single stock solution with the optional Vectra.
- Fast generation of sample list and application methods with TE Instruments software (TEIS).
- Low maintenance, optimal combustion and conditioning of gases results in near to zero downtime.
- Ultra-low detection limit, high stability and reliability due to the temperature controlled detectors and feedback loop.

Configuration: Xplorer with GLS*

Configuration: Xplorer with Vectra*

High Performance and High Throughput out of a Small Footprint

The Xplorer-NS combustion analyzer is capable of handling applications fully automated for 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 is automatically retracted from the hot area. No clamps or manual locking.
It takes approximately 45 seconds to change into the solids mode. Simply choose the pre-loaded sample list and run.

Manual or Robotics

Choose how the Xplorer will 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-NS.

If the analyzer operates in full automation, the robotic XYZ autosampler, the Vectra, handles all liquid samples up to 350 positions. It extracts the samples from 2 mL vials and is able to dilute samples and generate calibration standards automatically. Optional conditioned sample trays are available which are adjustable in temperature for higher and low boiling sample matrices.
For the introduction of gas and LPG samples, we introduced the GLS autosampler. 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-NS.
The introduction of solid samples can be executed by the stackable Newton autosampler, 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 autosampler enhances the overall quality, saves time and significantly reduces the need for spare parts and consumables.

Compliance and Regulations

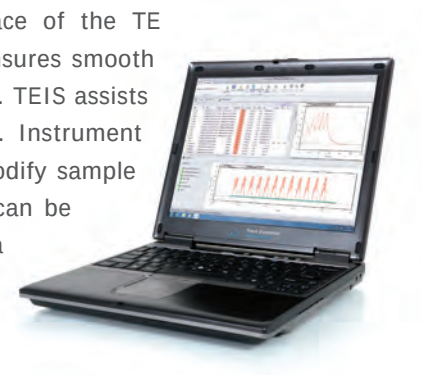
Our instrument complies with, but is not limited to, the following international standards for:

Total Sulfur	ASTM D5453 ASTM D6667 ASTM D7183 NEN-EN-ISO 20846
Total Nitrogen	ASTM D4629 ASTM D5762 ASTM D6069 ASTM D7184

For a complete overview, please visit: https://www.teinstruments.com/applications/international-standards/

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.
Shows 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

Regulatory bodies all over the world have set challenging low levels of allowed Sulfur concentration in organic fuels for the present and near future. Besides 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 certain feeds, has always been very important for the production processes in the refineries. For example: catalysts in refinery processes lose their efficiency because of catalyst poisoning. Main compounds to blame are Nitrogen and Sulfur.
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 Nitrogen and Sulfur 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, 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

Gases and LPGs

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, using the appropriate introduction module, into a furnace, where the oxidation takes place. After a complete combustion, Nitric oxide (NO) and Sulfur dioxide (SO_2) are formed and led into the serial connected reaction chambers, in the meantime water and particles have been removed.

Liquids module*

COMBUSTION

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

Nitrogen detection:

Electronically generated ozone is added which reacts with the nitric oxide to Nitrogen dioxide (NO_2^*) in an excited state (formed in the reaction chamber). The excited 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 detected emitted light, corresponds with the amount of NO. This in turn represents the amount of Total Nitrogen present in the sample.

DETECTION:

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

$$NO_2^* \longrightarrow NO_2 + hv_1$$

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:

$$SO_2 + hv_1 \longrightarrow SO_2^*$$

$$SO_2^* \longrightarrow SO_2 + hv_2$$

Configuration: Xplorer with Vectra*

Option: GLS Autosampler

Autosampler GLS*

The next generation Gas & LPG sampling system.

TE Instruments has developed the GLS, suitable for handling all sorts of gases and LPGs 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 autosampler with any other combustion analyzer.

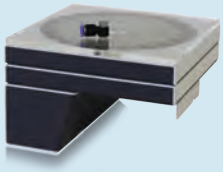
Option: Vectra Autosampler

Autosampler Vectra*

TE Instruments is proud to introduce our robotic liquids autosampler, Vectra.

The Vectra has versatile syringe compatibility with volumes ranging from 10 to 250 µL and is able 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 Autosampler



Autosampler Newton*

Newton autosampler, for absolute sample control, measuring up to 60 samples unattended.

TE Instruments Newton is a stackable batch & column autosampler, 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)
Weight	32 kg (70.5 lbs) without furnace tube and introduction
Voltage	100-240 V, 50-60 Hz
Power requirement (max)	1150 W
Gas connectors	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	Solid by boat, Liquid 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, adjustable method file
Slider/shutter driver	Software controlled, adjustable
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 2 software
Ambient temperature	5-35 °C (41-95 °F) non-condensing

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