

TSHR 6000 series TN/TS/TX analyzer

Versatile, Accurate and
Reliable Trace Level
Nitrogen, Sulfur, Chlorine Analysis

Petrochemicals

Refineries

Analytical Services

Research Analysis



The TSHR 6000 series TN/TS/TX Analyzer is the most flexible, reliable and easy to use Total Sulfur/Nitrogen/Chlorine Analyzer for an extended range of refinery and chemical application challenges.

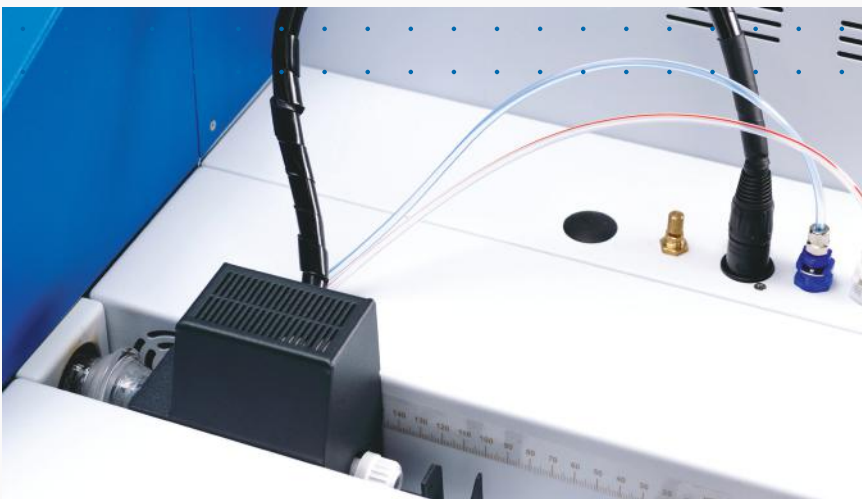
The analyzer enables quality control, commercial testing laboratories and R&D centers to analyze solid, liquid, Gas and LPG samples automatic, fast and precise. This combustion elemental analysis solution supported by Athena software makes this a routine and most powerful tool while meeting ASTM compliance.

The TSHR 6000 series TN/TS/TX analyzer is fully compliant with a range of international regulatory compliance methods such as ASTM, ISO, CEN, IP and UOP.

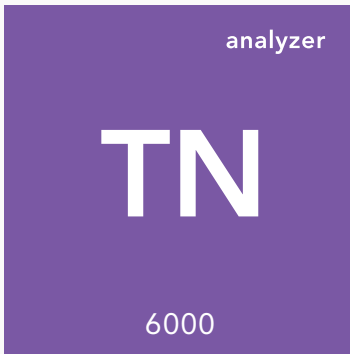
The TSHR 6000 model analyzer is available in a range of standard configurations with maximum modular flexibility to fulfill customer requirements. Also the ability to configure the 6000 model as fully fledged AOX/EOX analyzer, support the needs for environmental laboratories.

Typical applications include:

- Specification testing of refined products
- Quality testing of raw and processed (petro)chemicals
- Industrial waste and Environmental analysis
- Custody transfer of petrochemicals



TSHR TN 6000 – Total Nitrogen Analyzer



Total Nitrogen analysis is critical and important for lean, clean and responsible industries. Nitrogen containing compounds play an important role in the manufacturing processes of chemicals, petrochemicals and polymers. Levels of nitrogen emitted into the environment are stringently controlled by worldwide pollution legislation directives aimed in reducing global warming. The control and measurement of nitrogen levels in industrial materials and processes is also critical for the repeatability, efficiency and quality of the finished product to be maintained.

The TSHR TN 6000 Total Nitrogen Analyzer is designed to measure the Total Nitrogen content in a wide range of hydrocarbons sample types fast and accurate. The TN 6000 is matrix independent and complies fully with international regulatory methods including ASTM D4629, ASTM D5762, ASTM 6069, ASTM D7184 and UOP 971.

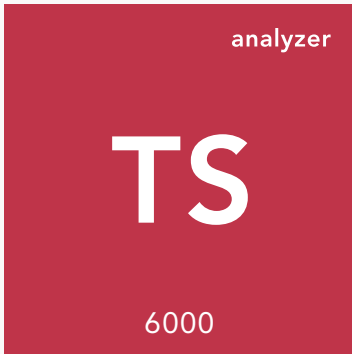
The TN 6000 can be converted into a fully fledge TN/TS/TX analyzer to maximize the analysis capabilities of total nitrogen, sulfur and chlorine content without compromise the performance.



- **Enhanced Versatility**
- **Semi- and fully automated solutions**
- **Unique Combustion Tube design**
- **Low ppb nitrogen detection capabilities**



TSHR TS 6000 – Total Sulfur Analyzer



Total Sulfur analysis is currently a need and increasing demand in the near future. As the full environmental impact of greenhouse gas emissions becomes apparent, regulatory agencies such as the US EPA are spearheading dramatic sulfur level restrictions in automotive fuels. Since the beginning of the 21st century the allowable sulfur content of diesel fuel has been reduced starting from 500 ppm, and desulfurization programs target down to < 10 ppm. These initiatives are being implemented on a global scale, and defined in clear needs and drivers towards more stringent limits of the sulfur content in automotive fuels, which require a fast, sensitive and precise analysis.

The TSHR TS 6000 model Total Sulfur analyzer incorporates a high-end pulsed UV-Fluorescence detector which provides superior stability and detection limits. Combined with excellent uptime, exceptional linearity and enhanced performance, the TS 6000 is a versatile solution for both routine and demanding applications. The TS 6000 model can also be configured as a combined TN/TS 6000 model to measure simultaneous the total sulfur and nitrogen content in liquid and Gas/LPG samples.

The TS 6000 is fully compliant to the following regulatory methods: ASTN D5453, ASTM D6667, ASTM D7183 and ISO 20846.

Full ASTM methods compliance

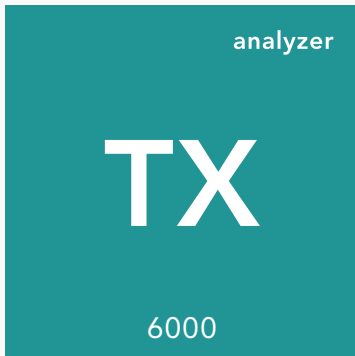
Fast switching between liquid and LPG/Gas samples

High sensitivity sulfur detector

Simultaneous TN/TS analysis



TSHR TX 6000 – Total Chlorine Analyzer



Robust long-life furnace design
Upgrade to Sulfur MCT
Short instrument start-up time
Ease-of-use coulometric cell

Total Chlorine analysis is essential for minimizing industrial running costs. Organic chlorides are introduced into crude oils to enhance the oil recovery process and arise from chlorinated solvents and additives used in crude oil production, transportation and storage. It is of paramount importance that in refinery process to remove this chlorine as it acts as a poison to catalysts used further in the production process and also corrodes pipelines, valves and condensers.

The TSHR Total Chlorine Analyzer, model TX 6000, incorporates a dedicated halogen titration cell which is ideally suited for microcoulometric detection of total chlorine. The titration method enables calibration free measurement and trouble-free detector to maximize productivity. The design of the TSHR microcoulometric solution enables customers to measure down to sub-ppb level total chlorine content.

The TX 6000 can also be converted into a sulfur microcoulometric analyzer to meet specific ASTM methods and customer needs.

The TX 6000 is fully compliant with the following methods: ASTM D4929, ASTM D5194, ASTM D5808 for Total Chlorine and ASTM D3120 and D3961 for Total Sulfur



Liquids Autosampler: HR 7000

The HR 7000 model autosampler is a fully fledged liquids sampler with unique capabilities to handle both high volatile and viscous samples, The HR 7000 is available in 5 different configurations with 15 and 121 sample positions, to support small and large laboratories and handle routine and challenging sample types. The sampler is controlled through Athena software and enable the user to prepare sample queues within standard configuration templates. The HR 7000 autosampler is also available with a temperature controlled sample tray and a vortex mixing tool to offer a complete solution for refinery and petrochemical application challenges.



- Compatible with all TSHR 6000 series models
- Can accommodate 2 mL screw cap sample vials
- Intelligent Dilution Protocol capability

Gas & LPG sample introduction Module: GM 7000

The TSHR GM 7000 is an add-on module to the TSHR 6000 Total Nitrogen/Sulfur/Chlorine Analyzer in order to sample and introduce Gas and LPG samples into the analyzer. The module consists of a 10 mL sample loop for gas samples and a 100 uL loop for sampling LPG sample types. The GM 7000 is operated and controlled through Athena software so enable the customer to reduce the handling time and ensure ease-of-use operation.

- Easily adapt to the TSHR 6000 Series
- Enables for safe and repeatable analysis of gases and LPG
- Fully integrated Athena Software Solution



TSHR Athena Software

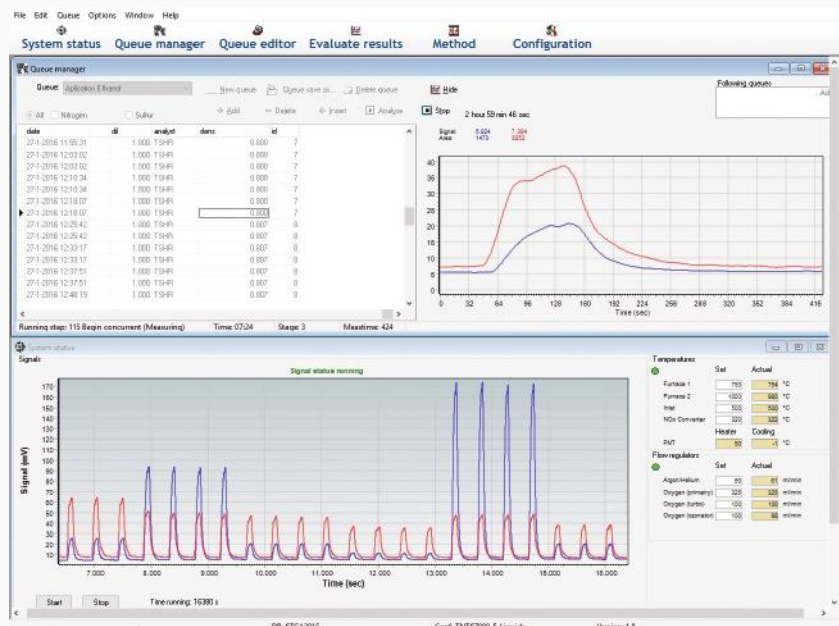
Ease-of-Use workflows for routine and R&D lab environments.

The Athena software package includes simple to use methods, sample workflows and analyzer control functionalities to keep your analyzer up at all time. The software will even adjust analyzer operation settings in stand-by and start-up modes to increase the productivity and help to achieve and report sulfur/nitrogen/chlorine analysis data in time.

Athena software also controls and operates the TSHR Liquid autosampler, HR 7000, and the TSHR Gas & LPG sample introduction module, GM 7000, as add-on modules to the TSHR TN/TS/TX analyzer models, which enhance customers convenience.

The Athena software includes the following key functionalities and benefits to the users:

- Real-time signal viewer and review of sample data
- Multiple calibration lines storage
- Online Temperature and Gasflow checks
- User interface control of system parameters
- Start-up/Standby options



TSHR Solutions for Combustion Elemental Analysis



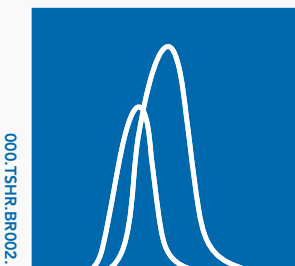
TSHR Analyzer model

Analysis	1800	6000	7000
Total Sulfur		●	●
Total Nitrogen		●	●
Total Sulfur / Nitrogen		●	●
Total Chlorine	●	●	●
Total Sulfur (MCT)	●	●	●
Total Sulfur/Nitrogen/Chlorine*		●	
Accessories:			
HR 7000		●	●
GM 7000		●	●

* Not simultaneous

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