**H₂S Analyzer**

Rapid measurement of H₂S in liquid petroleum products

For Marine Fuel:
IP 570 ‘Determination of Hydrogen Sulphide in Fuel Oil - Rapid Liquid Phase Extraction Method’

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Who should use the H₂S Analyzer?
- Refineries and Fuel Blending Locations
- Tank Storage Terminals
- Marine Bunker Fuel Suppliers
- Product Transfer Inspection Companies
- Independent Analytical Laboratory Services

For Marine Fuel:
IP 570 ‘Determination of Hydrogen Sulphide in Fuel Oil - Rapid Liquid Phase Extraction Method’
IP 570 included within ISO DIS 8217 Marine Fuel specification
An advanced instrument for the rapid measurement of \( \text{H}_2\text{S} \) in liquid petroleum products, including residual marine fuels, fuel oils and refinery feedstock components

- IP 570 new approved test method for \( \text{H}_2\text{S} \)
- \( \text{H}_2\text{S} \) content of fuel blends, cargoes & products in the distribution system
- Wide measurement range (0-250 ppm \( \text{H}_2\text{S} \))
- Fast measurement time of 15 minutes
- No wet chemistry involved
- Small lab bench footprint, fully portable operation
- Critical Measurement method for Product Safety

**Principle**

A small volume of sample is dissolved in a specially formulated diluent and heated under precisely controlled conditions to release any entrained \( \text{H}_2\text{S} \) present in the sample.

Clean air is passed through the test vessel and purges any \( \text{H}_2\text{S} \) gases into the sensor chamber where gas levels are measured; airflow through the sensor is monitored by a mass flow meter. When \( \text{H}_2\text{S} \) concentrations have been fully driven off from the sample, the Analyser will calculate and report the total volume of \( \text{H}_2\text{S} \) released.

**Operation**

20ml volume of diluent is decanted into the test vessel, which is then inserted into a heater chamber. When the diluent has reached 60°C (approximately 5 minutes), 1ml of sample is added.

Sample identity, operator name, empty/charged syringe values are input via the control membrane panel and the test is initiated by pressing the START/STOP Button.

**Automatic test result and error reports**

Thereafter sample analysis is fully automatic and results are stored to memory at the end of each test. The Analyser software automatically detects malfunctions and alerts if sample/test analysis is void.

**Download to PC**

Results can be printed out or downloaded via the RS232 interface.

**\( \text{H}_2\text{S} \) – Some of the safety issues**

Heightened concern regarding the risks posed by Hydrogen Sulphide (\( \text{H}_2\text{S} \)) in marine/oil fuels and the need to include mandatory \( \text{H}_2\text{S} \) measurement in fuel specifications.

\( \text{H}_2\text{S} \) has acute short-term toxicity to humans, animals and aquatic life posing a serious and potentially lethal hazard.

\( \text{H}_2\text{S} \) has the potential to corrode pipelines, storage tanks and other ship components.

Some fuels may appear innocuous but can evolve and release dangerous levels of \( \text{H}_2\text{S} \) – safety checks are needed to determine the propensity of marine fuel to release entrained \( \text{H}_2\text{S} \).

\( \text{H}_2\text{S} \) gas can accumulate as a result of storage time, elevated temperature, agitation, biotic/chemical decomposition and others factors to which the fuel may be exposed.

Significant concentrations of \( \text{H}_2\text{S} \) are known to accumulate in the headspaces of storage tanks and cargo holds.

Traditional wet chemical tests used for determining \( \text{H}_2\text{S} \) concentrations may ‘unlock’ \( \text{H}_2\text{S} \) within scavenged Marine Fuel and when measured may provide erroneous and unreliable test results.

**Specification**

- **Measurement range:** 0-250 mg/kg \( \text{H}_2\text{S} \) in the liquid phase (0-250 ppm \( \text{H}_2\text{S} \))
- **Operating limits:** 5 – 40°C maximum (80% RH)
- **Viscosity range:** Up to 3000 mm²/s
- **Principle of measurement:** Advanced Electrochemical sensor
- **Test duration:** 15 minutes
- **Sample size:** 1ml, 2ml, 5ml (depending on \( \text{H}_2\text{S} \) concentration)
- **Diluent volume:** 20ml
- **Voltage:** 12V DC, supplied with universal A/C transformer
- **Power:** 60W max
- **Computer interface:** RS232
- **Size (H x W x D):** 210 x 300 x 410 mm
- **Weight:** 8kg

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**Repeatability and Reproducibility vs \( \text{H}_2\text{S} \) Concentration**

- **Repeatability**
- **Reproducibility**

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**Graphs and images**

- Diagrams showing test procedures and results.
- Graphs illustrating \( \text{H}_2\text{S} \) concentration vs repeatability and reproducibility.

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**The \( \text{H}_2\text{S} \) Analyser**

The \( \text{H}_2\text{S} \) Analyser has been developed with support from Lloyd’s Register’s ‘Fuel Oil and Bunker Analysis Service' (FOBAS) and other major international oil companies and provides a very simple-to-use instrument.

\( \text{H}_2\text{S} \) is efficiently purged from the test sample by a combination of heat and agitation, and is measured by an advanced \( \text{H}_2\text{S} \) specific detector system.

The instrument offers a highly cost effective solution for \( \text{H}_2\text{S} \) measurement – no expensive chemicals are required and there is no need for analytical preparation by an expert chemist.

The \( \text{H}_2\text{S} \) Analyser provides an excellent analytical tool which supports improved product Quality Control and Safety helping to ensure products meet approved specifications.

The instrument also assists with product remediation treatment of feedstock components and off-spec products, offering very fast determination of \( \text{H}_2\text{S} \) and rapid repeat sample measurement capability.

The Analyser also has the capability to measure certain crude oil and other distillate products (in conjunction with technical guidance from SetaAnalytics).