LAB-X5000

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The LAB-X5000 benchtop analysers present many advantages:

- Compact and robust: ideally suited for onboard a ship, port side or in a lab
- Laboratory quality results: complies with ASTM D4294, ISO 8754 and IP336 sulfur test methods
- Easy to use: insert sample cup and press Start
- Low running costs: no Helium gas needed
- No unexpected results: Automatic correction for different fuel types and for chlorine contamination
- Flexible data management that allows you to store and share results easily

Ensuring marine fuel oil meets the latest IMO sulfur limits with the LAB-X5000

INTRODUCTION

The International Maritime Organisation (IMO) has been working for many years to reduce the harmful impact of shipping to the environment. As part of ongoing efforts to reduce air pollution from the burning of marine fuels, the IMO recently announced that the proposed 0.50% global sulfur cap on marine fuels will come into effect on January 1, 2020. This is a significant reduction from the current limit of 3.50%. Within sulfur emission control areas (SECAs), the sulfur limit remains at the 0.10% level established in 2015.

To ensure compliance with marine fuel regulations, ship owners must ensure they use fuel that meet specifications in all locations, i.e. monitor the fuel's sulfur level in the settling tank during the fuel switch over before entering SECAs.

Government laboratories also perform spot-checks on the ships in the SECA ports to ensure compliance. In this case, the analytical equipment used for the test needs to be fully portable.



OUR SOLUTION FOR ENSURING FUEL CONFORMANCE TO THE 2020 IMO SULFUR REGULATIONS

With the Hitachi High Tech LAB-X5000 EDXRF analyser, the analysis of bunker fuel couldn't be easier. Routine analysis is carried out by drawing a sample into a sample cup, placing the cup in the analysis port, and pressing a button to start the measurement. Results are displayed within seconds on the large, industrial LCD touch screen, showing the sulfur content. Pass/fail messages can also be setup to show quickly if a fuel does not meet specifications.

The LAB-X5000 includes several features that help protect against damage caused by sample spills or leaks to minimise downtime and prevent costly repairs. Sample cups fit inside a secondary safety window that contains leaks from the cup. These windows are fitted with Poly-M film. They are re-usable and the film can be changed in seconds (no need for a tool). The Lab-X includes an automated turntable that only places the sample above the X-ray tube and detector for the duration of the analysis, minimising the risk of damage or contamination to critical components. And an audible alert is generated when the analysis is finished to remind users that the sample should be removed.

The combination of a high-resolution detector and optimised calibration parameters ensure that you get results you can trust for a wide variety of bunker fuel oils and blends. The LAB-X even corrects automatically for chlorine that can be present in the oil as a contaminant.

The LAB-X5000 can be delivered already calibrated (to ISO and ASTM test methods), so it is ready for routine analysis as soon as it is installed.

With up to 100,000 results stored on the analyser itself, operators can view new and old results easily, print them on the integrated printer for a hard-copy record, download them on a USB memory device, and even upload them to our cloud service to manage them remotely. When connected to WiFi, the results are uploaded to your cloud account automatically, so you do not need to be near the analyser to access your data!

SAMPLE PREPARATION

The sample preparation is simple: just pour the oil into a sample cup fitted with Poly-M film, place it in the safety window in the LAB-X's analysis port, and press the Start button.



2018-05-01 16-19-30		S IN OTL 0.1-5 % / DELIV	ERY RT 01/05/18
Element	Concentration	Unit	Pass/Fail
S	2.070	%	Fail
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Clear results display

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		20.12.2017 11:53 am 5 months ago	b7	LAB-X5000	100010	0
		20.12.2017 11.51 am 5 months ago	b6	LAB-X5000	100010	
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Example screen for our cloud-based service.

PERFORMANCE AND RESULTS

The data shown in this section highlights the typical performance that the LAB-X delivers. A simple empirical calibration was created for sulfur determination by measuring a series of mineral oil standards to establish the relationship between sulfur content and X-ray signal. The calibration used pre-defined parameters that are included in the LAB-X Sulfur package. Note: the same performance would be obtained with the factory-calibrated LAB-X.

Table 1. Typical calibration performance for sulfur determination in oil

Analyte	Concentration range	Standard error of calibration	Measurement time	Precision at mid-range (95 % confidence)
S	0 – 1000 ppm	6 ppm	300 s	5 ppm
	0.1 – 5 %	0.02 %	50 s	< 0.01 %

Table 2. Typical accuracy data for a variety of oil types

Sample Name	Fuel type	Known sulfur	LAB-X5000 result
S Oil 1	Mineral oil	0.50 %	0.50 %
S Oil 2	Mineral oil	1.00 %	1.00 %
S Oil 3	Mineral oil	3.00 %	3.03 %
NIST 1624d	Diesel fuel oil	0.39 %	0.39 %
NIST 1623c	Residual fuel oil	0.38 %	0.38 %
NIST 1622e	Residual fuel oil	2.15 %	2.07 %

Table 3. Typical accuracy data for oil samples containing chlorine (CI)

Sample Name	Fuel type	Known sulfur	LAB-X5000 result
S CI Oil 1	Mineral oil	0.10 % (contains 0.8 % Cl)	0.11 %
S CI Oil 2	Mineral oil	0.40 % (contains 0.1 % Cl)	0.40 %
S CI Oil 3	Mineral oil	0.50 % (contains 0.4 % Cl)	0.50 %

SUMMARY

Once calibrated, Hitachi High-Tech's LAB-X5000 provides reliable sulfur analysis for a wide variety of fuels, even when chlorine is present as a contaminant. Its ease of use and ruggedness make it an ideal tool on ships for the monitoring of sulfur content in bunker fuel, and ensuring compliance to the IMO sulfur regulations.

Visit www.hitachi-hightech.com/hha for more information.

ORDERING INFORMATION MINIMUM REQUIRED:

LAB-X5000 Sulfur Analyser package, which includes: the analyser, user manual (on USB memory device), pre-loaded method parameters and method sheets (calibration instructions), setting up samples, and all sample preparation accessories required for the analysis of fuel samples.

Light mineral oil, supplied by user, or purchased as extra (part number 54-CM0038)

OPTIONAL EXTRAS:

To have the analyser already calibrated when delivered:

- Factory calibration (0-1000 ppm sulfur and 0.1 to 5 % sulfur), part number 54-4106643
- To calibrate the analyser after installation (i.e. when not factory calibrated):
 - Sulfur in mineral oil standards 0 1000 ppm, part number 54-CS0008
- Sulfur in mineral oil standards 0 5 %, part number 54-CS0001

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