Z-SPEC | TECNOVA HT — WE MEASURE ‹-› YOU CONTROL | POWERED BY XOS®

Sulfur Measurement for Marine

A portable and robust sulfur analyzer for Marine.
Ensure Sulfur Compliance for IMO 2020 & ECAs

Sea16

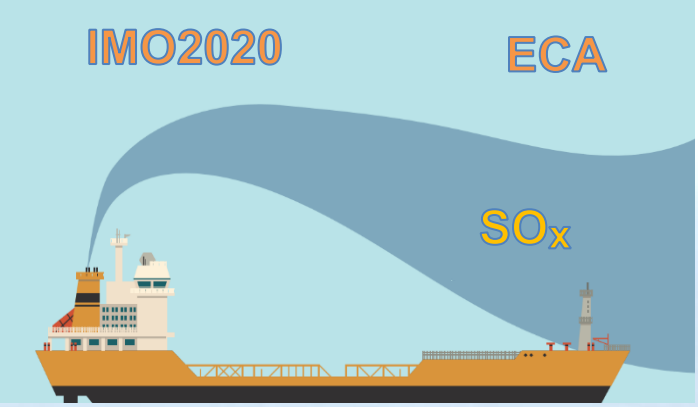
Sulfur Analyzer for Marine

The Sea16 is an easy-to-use and robust analyzer, designed to provide high-precision ISO 8754 and D4294 sulfur analysis for the marine industry in preparation for the IMO 2020 regulation.

ISO 8754
ASTM D4294

TECNOVA HT — WE MEASURE ‹-› YOU CONTROL

Ensure Sulfur Compliance Anywhere at Sea



In 2015, SECA trade partners restricted sulfur emissions to 0.1% sulfur content within 24 nautical miles (or less) from shore. On January 1, 2020, the International Maritime Organization's (IMO) revised MARPOL Annex VI rule will come into effect, which will lower the maximum global sulfur cap for emissions from 3.50% to 0.50%. While the Emission Control Areas (ECAs) will remain at the 2015 standard of 0.10% S content. To ensure compliance with both regulations, merchant ships will need to strictly monitor sulfur content in fuel. Sea^{16} was designed to meet these needs with easy, rapid, and precise sulfur analysis.

Rapid Sulfur Testing with Sea^{16}

Sea^{16} delivers rapid and precise sulfur testing with a limit of detection as low as 0.0050% - well below the new regulatory limits. To ensure lab-quality results and compliance with methods approved for marine-fuel testing (covered under ISO 8217), Sea^{16} is compliant with ISO 8754 and ASTM D4294 in the concentration range of 0.01%-5%.

To demonstrate the precision of Sea^{16}, an application study was conducted using three mineral oil samples with sulfur concentrations close to the expected levels in various types of marine fuel. Results are shown in **Table 1**.

Table 1: Sea^{16} Study Results

Repeat	450 ppm	0.1%	0.5%
1	455.5	0.099	0.500
2	472.9	0.101	0.494
3	452.7	0.101	0.502
4	464.6	0.100	0.496
5	463.5	0.100	0.499
6	468.4	0.101	0.501
7	454.7	0.099	0.498
8	461.1	0.098	0.502
9	460.0	0.101	0.496
10	465.5	0.100	0.497
Average	461.9	0.100	0.498
Standard Deviation	6.4	0.001	0.003
RSD%	1.4%	1%	0.6%

Features & Benefits

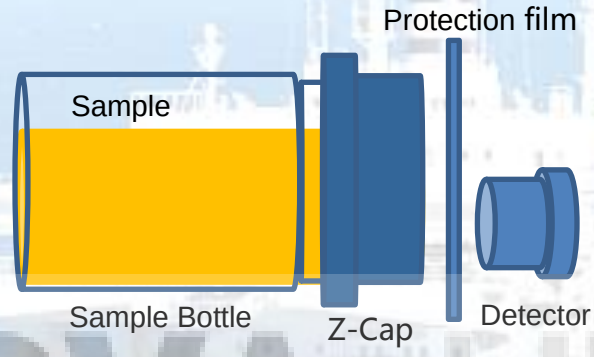
- Robust design for maritime environment
- Onboard, offshore, or on-land testing
- Portable with built-in battery
- Minimum sample preparation with sample bottle
- Advanced detector to ensure long-term stability
- Trusted precision with lab-quality results
- Robust calibration with one curve covering whole range
- Complies with ISO 8754 and ASTM D4294

Easy-to-use and Robust Design

Sea^{16} was designed to provide reliable, rapid, and robust sulfur analysis, with an innovative sample carrier that is compatible with both sample bottle and sample cup. The sample is inserted with the sample window vertical, ensuring that any accidental sample leak goes into a drip tray which could be simply removed and cleaned. If desired, sample preparation is as easy as replacing the sample bottle cap with Z-cap with built-in thin film. This analyzer can be operated by a crew member with minimal training, in some cases less than 15 minutes.

Sample Bottle and Z-cap

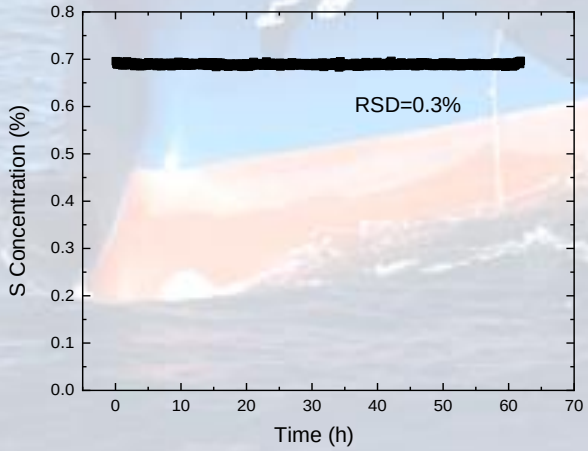
Sea^{16} side sample loading



Robust Stability

The robust stability has been tested through continuous measurement of standard NIST fuel oil sample 1619b (0.698%) within the temperature range from 10 °C to 30 °C. Results are shown in **Figure 1**.

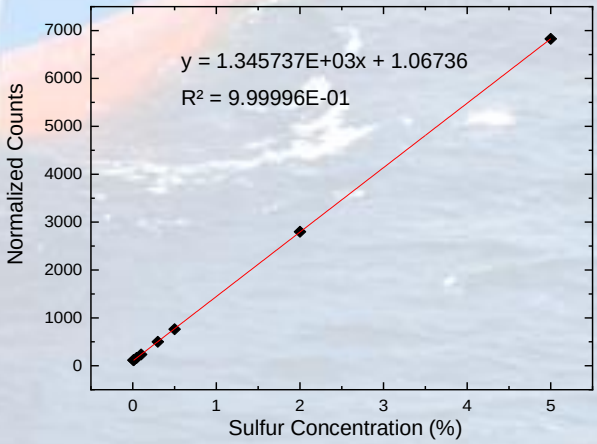
Figure 1. Stability test



Robust Calibration

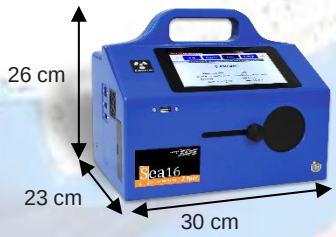
With corrected net counts, the calibration covers the whole range of marine application with one linear curve, ensuring robust calibration with precise sulfur analysis. Results are shown in **Figure 2.**

Figure 2. Calibration



Technical Specifications

Dynamic Range & Applications		
Sea^{16}	**Dynamic Range**	**Sulfur 16 ppm – 5 wt%**
	Applications	**Sulfur in Marine fuel**

Sea^{16} Specifications	
Method Compliance	ASTM D4294 & ISO 8754
Measurement Time	30-900 seconds
Calibration	- 30 calibration curves - Linear (automatic customer calibration available)
Sample Cup Volume	10 mL
Sample Bottle Volume	25 mL
Data Output	Printout, USB, and Ethernet to PC connection
I/O Ports	Ethernet 10/100, USB
AC Power Supply	110-240 VAC ± 10%, 50-60 Hz (hertz)
Battery Power	98 Wh for >4 hours continuous operation
Operating Temperature	5°C to 40°C (41°F to 104°F)
Operating Humidity	30 – 85 %
Weight	16 lbs (7.2 kg)
Dimensions	23 cm W x 30 cm L x 26 cm H 

Z-Spec – XOS joint effort

Z-Spec and XOS have partnered together to provide an easy-to-use, robust solution to the marine industry in preparation for the IMO 2020 regulation. By combining XOS' industry-leading XRF technology with Z-Spec's product-development expertise in the marine industry, we're able to deliver the most practical and effective solution to meet customer's application needs.

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