

# Certificate of Analysis

Sulfur in Mineral Oil  
Calibration Standards  
Certified Reference Materials

**Expiration Date:**  
September 25, 2025

**Product Code:**

SMO10

**Lot Number:**

092623CL

| Standard Number                                       | Lot Number                              | Concentration wt% | Expanded Degree of Uncertainty       |
|---|---|-------------------|--------------------------------------|
| 1   | 092623CL-1                              | 0.0000            | 0.0000                               |
| 2   | 092623CL-2                              | 0.0025            | 0.0000                               |
| 3   | 092623CL-3                              | 0.0050            | 0.0001                               |
| 4   | 092623CL-4                              | 0.0100            | 0.0001                               |
| 5   | 092623CL-5                              | 0.0200            | 0.0002                               |
| 6   | 092623CL-6                              | 0.0401            | 0.0004                               |
| 7   | 092623CL-7                              | 0.0502            | 0.0005                               |
| 8   | 092623CL-8                              | 0.0602            | 0.0006                               |
| 9   | 092623CL-9                              | 0.0803            | 0.0008                               |
| 10  | 092623CL-10                             | 0.1005            | 0.0010                               |
| <b>Standard deviation (2-Sigma):</b><br>1% (Relative) | Approximate Matrix Viscosity<br>4.5 cSt |                   | <b>Density @20°C:</b><br>0.8212 g/mL |

The following reference material was verified by wavelength dispersive x-ray fluorescence spectrometry, (WDXRF) method ASTM D2622 and is traceable to NIST SRM 2723b (sulfur in diesel fuel oil), NIST SRM 2770 (sulfur in diesel fuel oil) NIST SRM # 1616b (sulfur in kerosene), NIST SRM # 2717a (sulfur in residual fuel oil), and/or NIST SRM 1624d (sulfur in diesel fuel oil). This reference material is suitable for ASTM Method D4294.

Instructions for Use: We recommend that the standard solution be thoroughly mixed by shaking or swirling of the bottle prior to use. To achieve the highest accuracy the analyst should: (1) use only pre-cleaned containers and pipette, (2) use a minimum sub-sample size of 7 to 7.1g, (3) make dilutions using calibrated balances or class A volumetric flasks and pipettes, (4) If dilute with the different matrix than the original CRM then to take matrix effect into consideration, and (5) never pour used product back into the original container. The solution should be kept tightly capped and stored under normal laboratory conditions. Fresh solutions should be prepared daily. Do not freeze, heat, or expose to direct sunlight.

ASI Standards



Lorena Jimenez  
Quality Control Manager



1. **Quality Documentation:** This certificate is designed in accordance with ISO guide 31 (Reference Materials - Contents of Certificates and Labels) and ISO Guide 35 (Reference Materials - General and Statistical Principles for Certification).
2. **Quality Standards:** ISO 9001:2015 Quality Management System - Requirements SAI Global Registrations Certificate No.: 0107358 & ISO 17034:2016 Reference Material Producer - Requirements ANAB Registration Certificate No.: AR-2640.
3. **Intended Use:** The product covered by this certificate is designed for calibration or for use in quality control procedures for the specified chemical compounds listed on the reverse side. This product can be used for quantification and/or identification. This product can also be used as a reference material to validate analytical procedures, subject to the conditions under section 11. If dilution is required use Class A Glassware and diluent compatible with all certified analytes in this preparation. All solutions should be thoroughly mixed prior to use.
4. **Raw Materials:** Reference Standards are prepared from the highest quality starting materials with defined purities. All analytes and solvents are obtained from pre-qualified vendors and then analyzed or evaluated prior to use.
5. **Manufacturing:** All Balances are calibrated daily using an in-house procedure with weights that are compared annually to master weights and traceable to NIST. The balances are also calibrated annually by an ISO/IEC 17025 accredited calibration laboratory. Class A glassware is used in the manufacture and quality control of all standards and calibrated using an in-house procedure. Good Laboratory Practices have been used throughout the preparation of this CRM. Please refer to the NIST test number listed on the front of this certificate.
6. **Homogeneity Assessment:** Homogeneity of the finished product is assessed by analyzing sample batches or by other methods consistent with the intended use of the product and by procedures that comply with the appropriate Quality System requirements.
7. **Stability Assessment:** The manufacturer guarantees the stability of this solution through the expiration date stated on the label when handled and stored according to the conditions stated on the label. To ensure a uniform solution, mix the contents of the sealed container prior to use. Care should be taken not to contaminate the contents of the original container.
8. **Analytical Quality Control:** Products are tested by validated analytical methods specified in the manufacturer's Quality Management System.
9. **Uncertainty Statistics and Confidence Limits:** The Uncertainty values as stated on the face of this certificate have been determined using EURACHEM/CITAC Guide (Quantifying Uncertainty in Analytical Measurement). We have evaluated both Type A (based on a series of observations) and Type B (manufacturers specifications and calibration data) factors and report a combined expanded uncertainty equal to the positive square root of the total variance of the uncertainty of the components using the following formula  

$$u_m = \sqrt{(u(P))^2 + (u(m))^2 + (u(V))^2}$$
 The expanded uncertainty, U, assumes a normal distribution and a coverage factor of k=2 is chosen using a 95% confidence level. For analysis, the certified value should be used as the actual value.
10. **Labels:** We have determined that label would peel off or become illegible if an excessive amount of solvent came in contact with the label. For any replacement label, provide the invoice number or record of purchase with lot number.

11. **Warranties:** The Manufacturer warrants that its products shall conform to the description of such products as provided in its catalog or on specific product label. This warranty is exclusive, and the manufacturer makes no other warranty, express or implied, including any implied warranty of merchantability or fitness for any purpose.
12. **Legal Notice and limit of liability:** This product is for routine laboratory analysis and research purposes only. Due to the hazardous nature, only trained personnel should handle this product. The Company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.
13. Distributors must comply with relevant clauses in ISO 17034 for handling, storage, labeling, and claims. Each approved distributor that sells material compliant with ISO 17034 must comply with the distributor terms found here: <https://www.asistandards.com/terms-of-service/>

*Our Standards are traceable to various NIST SRMs*

| Element | NIST SRM | Element | NIST SRM |
|---------|----------|---------|----------|
| Ag      | 1077a    | Li      | 3129a    |
| Al      | 1075a    | Mg      | 3131a    |
| As      | 3103a    | Mn      | 3132     |
| Au      | 3121     | Mo      | 3134     |
| B       | 3107     | Na      | 1069b    |
| Ba      | 1051b    | Ni      | 1065b    |
| Be      | 3105a    | P       | 3139a    |
| Bi      | 3106     | Pb      | 1059c    |
| Br      | 3184     | Pt      | 3140     |
| Ca      | 3109a    | S       | 2723b    |
| Cd      | 1053a    | Sb      | 3102a    |
| Ce      | 3110     | Se      | 3149     |
| Cl      | 1818a    | Si      | 1066a    |
| Co      | 3113     | Sn      | 1057b    |
| Cr      | 1078b    | Sr      | 3153a    |
| Cu      | 1080a    | Ti      | 3162a    |
| Fe      | 1079b    | Tl      | 3158     |
| Ga      | 3119a    | V       | 1052b    |
| Hg      | 3133     | Y       | 3167a    |
| K       | 3141a    | Zn      | 3168a    |
|         |          | Zr      | 3169     |

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