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**Certificate of Analysis**  
**Part No. B2332**  
**High Sulphur Residual Oil**  
**Standard**

Certificate Number 862220  
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**Weight % Sulphur = 9.64**  
**Expanded Uncertainty =  $\pm 0.66$**   
**( $k=2.1$ , @95% confidence limit,  $n=20$ )**

Methods used for analysis:  
ASTM D 1552-16, and ARI-035

Reference standards used: AR2863-861009, AR2862-862909, AR2864-864708, AR2863-863816

The intended use of this standard is for the calibration and or verification of sulphur analysis in petroleum-based materials by combustion IR detection or other valid testing methods. This standard was produced gravimetrically using high purity materials, with balances calibrated by precision NIST traceable weights, and verified using the above ASTM method. The uncertainty value represents the estimated expanded uncertainty using ANOVA, ISO Guide 35, and the Guide to Uncertainty Measurement. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. The sample size used for analysis was approximately 50mg. Sample size and minimum sample size may be contingent upon your test method or instrumentation manufacturer recommendations. The material used in production of this standard was sampled in accordance with ARI 041. The samples for round robin testing were selected in accordance with ARI 031. When necessary, professional judgment is applied toward consideration of data and statistical information. Normal ASTM procedures should be employed when using this standard. This includes using the reproducibility and repeatability factors for the ASTM method you wish to employ for overall method uncertainty. The above values relate only to the material used to produce this standard.

Before use, the contents of the bottle should be mixed by vigorous shaking. Any exposure to air and light should be kept to a minimum. Keep sealed and store upright under normal laboratory conditions. This bottle contains 100ml to be used as per the test method. While unable to determine a definite shelf life this reference should be reviewed 20 years from the date of certification. Once opened this certificate is valid for two years. Remedies for any claimed defect in this product will be limited to product replacement or refund of the purchase price. In no event, shall Elemental Microanalysis Ltd be liable for incidental or consequential damages. This certificate cannot be reproduced except in full.

This Reference Material is traceable to the above-mentioned standards. For good laboratory practice, it is recommended that all standards be verified as fit for purpose prior to use.

Elemental Microanalysis Limited

This CRM is valid for two years from the date of opening

Certified on the 28<sup>th</sup> of February 2020