ACIRS-S2A-2020

SULFUR REFERENCE MATERIAL

CERTIFICATE of ANALYSIS

Production and certification of this sample was conducted in accordance with ISO 17034.

ACIRS-S2A-2020				
	Certified Value[1]	**Standard Deviation[2]**	**Expanded Uncertainty[3]**	**Number of results**
Total Sulfur, % d	**0.433**	**0.005**	**0.002**	**28**

[1] Certified value is the best estimate of the true value. It is an unweighted robust mean value of the means of an accepted dataset obtained from fourteen different ISO/IEC 17025 accredited laboratories who each tested two unique samples. The certified value and its uncertainty are defined by test method ISO 19579[i] and are traceable to the International System of units (SI).

[2] Standard deviation (sd) is a robust value used to derive the likely range of results. For normally distributed data, the value for a measurand from a randomly chosen laboratory would be expected to lay within 2 standards deviations of the certified value with 95% probability.

[3] The expanded uncertainty provides the user with information on the likely range of the true (but unknown) value for each parameter and has been estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM) with a coverage factor k= 2, corresponding to a level of confidence of about 95%.

Date of Issue: 31 March 2020
Report Number: COA-S2A-2020-rev0
Previous ACIRS-S series: This is the second in the series and supersedes ACIRS-S2A-2011

1. Introduction

This report describes the preparation and certification of ACIRS–S2A-2020 which comprises a sealed jar containing approximately 125 g of reference coal at a nominal top size of 212 µm.

This reference material is a higher rank bituminous coal intended to be used for quality control and calibration purposes for the analysis of similar coals.

2. Description of the Sample and Preparation

ACIRS–S2A-2020 comprises a sealed jar containing approximately 125 g of coal at a nominal top size of 212 µm. This sample was prepared from 150 kg of a Queensland, Bowen Basin higher rank bituminous coal at -50 mm top size.

The bulk coal sample was crushed in a swing hammer mill to a nominal top size of 2.36 mm and stabilised over a 3-month period. The material was then repeatedly mixed by rotary sample division (RSD) until lots of approximately 1.4 kg were obtained which were then air dried and milled to a nominal top size of 212 µm. This pulverised material was further divided by RSD until representative 125 (± 5) g samples were obtained. Each sample was then placed into a plastic bag within sealed HDPE jars.

Between-unit homogeneity was quantified by testing ash and total sulfur and assessed in accordance with ISO 17034.

3. Instructions for Use

Before first use, empty the sample from the inner plastic bag directly into the HDPE jar.

Before each use, the bottle **must** be thoroughly mixed by end-over-end rotation to re-homogenise the coal sample.

To minimise the risk of compositional changes due to oxidation store in a cool, dark place in original containers with lids tightly sealed. ACIRS cannot be held responsible for any changes that occur after the sample bottle has been opened.

Samples should be prepared and analysed in accordance with ISO 19579[i] using a minimum sample size of 0.3 g. Corrections to dry basis values should be in accordance with ISO 11722[i].

4. Characterisation

ACIRS-S2A was characterised in an independent test program conducted by ACIRS involving fourteen Australian laboratories accredited to ISO/IEC 17025.

Each participant was provided two unique samples tested by ISO 19579[i] for total sulfur (TS). Corrections to dry basis values were in accordance with ISO 11722[i]. All participant results passed tests for technical validity i.e. there was no excluded data, n=28.

NIST SRM 2693 (0.4571% TS, d) was provided to participants for instrument calibrations and quality assurance purposes. The robust mean of concurrent analyses was 0.459% TS, d.

The certified value for total sulfur and its associated uncertainty were calculated from an unweighted mean value of by robust means in accordance with the guidelines of:

- ISO/IEC Guide 98-3, Guide to the Expression of Uncertainty in Measurement (GUM)
- ISO 13528-2015, Statistical methods for use in proficiency testing by interlaboratory comparison, and
- ISO Guide 35 -2017, Reference Materials – Guidance for characterization and assessment of homogeneity and stability.

5. Metrological Traceability

Traceability to SI units for all relevant input factors was achieved by using laboratories accredited to ISO/IEC 17025 undertaking analysis of total sulfur by ISO 19579[i]. NIST SRM 2693 (0.4571% TS, d) was used for instrument calibration and quality assurance. This is a bituminous coal reference material listed on the Bureau International des Poids et Measures, Key Comparison Database (BIPM-KCDB) thereby providing traceability to a higher order reference material.

6. Period of Validity

Property values for coal samples are subject to change due to the normal oxidation processes for coals. For this reason, when stored and used in accordance with this certificate, ACIRS-S2A is considered stable until January 2027.

The stability of this sample will be monitored by ACIRS. It is the responsibility of the user to obtain the most recent Certification Report for this reference material available at www.acirs.com.au/products/acirs-sulfur-reference-materials-/

7. Health and Safety

Samples shall be handled in accordance with the Safety Data Sheet available from www.acirs.com.au/products/acirs-sulfur-reference-materials-/

8. Legal Notice

To the extent permitted by law, ACIRS disclaims all warranties whether expressed or implied with regard to merchantability, non-infringement, or fitness for a particular purpose. In no event will ACIRS be liable for incidental damage or consequential loss arising from the use of this product.

Where the product does not conform to assigned property values, giving due consideration to the stated uncertainties and accepted tolerances, the total liability of ACIRS shall be limited at ACIRS' absolute discretion to either replacement of the product or refund of the purchase price.

9. Revision History

Document Number	Summary	Date
CR-S2A-2020-rev0	Original	31/03/2020

10. Authorisation

Approved by Christine Foster, ACIRS Operations Manager
Australian Coal Industry Reference Samples (ACIRS)
PO Box 2315, DANGAR NSW 2309, AUSTRALIA
Phone +61 (2) 4926 4870
Fax +61 (2) 4926 4902
Email acpsnational@acps.com.au

[i] Most recent version of the test method (and technical equivalents)