

Coal Certified Reference Material

Product No: AR1702**Lot No: 240716**

Material and Use

AR1702 is a Certified Reference Material (CRM) traceable to the listed primary reference standards. All reference materials should be verified as fit for purpose prior to use. The intended use of this CRM is for the verification and calibration of resistance furnace combustion (or other appropriate) analyzers for the determination of sulfur. Each bottle contains 50 g of reference material as a fine powder (-60 mesh). Typical sample size for analytical testing is dependent upon the test method and instrumentation used, however, a minimum sample size of 0.3 g to 0.5 g is recommended. This product should be kept sealed tight and stored under normal laboratory conditions. Certified values are valid for 15 years from the initial date of certification.

Element	Value	(+/-)	Method & Detection	n	k
% Sulfur	0.74	0.03	Combustion/IR	42	2.0

Note: (+/-) indicates expanded uncertainty.

Traceability

The reported values are metrologically traceable to the SI derived unit of mass fraction expressed as a percent. The reported values were measured using the following primary reference standards:

AR	1702-702322, 1723-723823, 1704-704713
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Methods and References

ARI-LAB-616 – Alpha Resources Method, Sulfur Analysis by High Temperature Tube Furnace Combustion
ASTM D4239-18 – Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion
ISO/IEC 17025:2017 – General requirements for the competence of testing and calibration laboratories
ISO 17034:2016 – General requirements for the competence of reference material producers
ISO 33401:2024 – Reference materials – Contents of certificates, labels, and accompanying documentation
ISO Guide 30:2015 – Terms and definitions used in connection with reference materials
ISO Guide 35:2017 – Reference materials – General and statistical principles for certification

Calculation of Reported Values

Analytical values are accredited under Alpha Resources, LLC ISO/IEC 17025 and ISO 17034 accreditation issued by ANSI National Accreditation Board (ANAB). Please refer to certificates and scopes of accreditation AT-1200 and AR-1920. Sampling and calculation of reported values for each analyte are performed in compliance with guidance found in ISO 17034, ISO 33401, and ISO Guide 35. Material homogeneity, uncertainty of primary reference standards, characterization uncertainty from contributing laboratories, and other factors are considered in the assessment of overall measurement uncertainty. Analysis of variance is used in the calculation of uncertainty between contributing labs and between samples. Expanded uncertainty is calculated by application of a coverage factor to the combined uncertainty value.

**Dustin Jenkins, Ph.D.****Global Technical Director****Certification Date:** August 29, 2024**Updated:** February 11, 2025

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