Wood Pulp Biomass Certified Reference Material

Product No: AR1946

Lot No: 240627

Material and Intended Use

AR1946 is a wood pulp biomass certified reference material (CRM). The intended use of this CRM is for the verification and/or calibration of the analytical methods listed below. This CRM can also be used to validate value assignment of in-house reference materials. A unit consists of one bottle containing 50 g of reference material as a fine powder. All reference materials should be verified as fit for purpose prior to use.

Instructions for Use

This product should be dried prior to use in a manner consistent with the analytical methods referenced below. The minimum sample size for analysis is dependent upon the test method and instrumentation used. Bottles of powder should be kept sealed tight and stored in a cool, dry location. Property values are valid for 5 years from the initial date of certification if handling and storage instructions are followed. Property values are rendered null and void if the CRM is in any way modified or damaged.

Reported Values

Property values for a chemical element or constituent indicate the amount of each present in the overall material matrix and are metrologically traceable to the International System of Units (SI) derived unit of mass fraction expressed as a percent (%). Reported calorimetric values indicate the heat of combustion of the overall material matrix and are metrologically traceable to the derived unit of British Thermal Units per pound (BTU/lb). Certified values are reported as the mean property value with an expanded uncertainty ($U_{95\%}$). The true value of the measurand is believed to lie within the expanded uncertainty coverage interval with 95% confidence. Expanded uncertainty is calculated by application of a coverage factor (k) to the combined standard uncertainty (u_c). For laboratory uncertainty budgets, the combined standard uncertainty can be calculated as $u_c = U_{95\%}/k$, where k is approximately equal to 2. The estimation of combined standard uncertainty (u_c) includes contributions from material homogeneity, primary calibrants, characterization, and other factors. Sampling and calculation of reported values for each measurand are performed using practices consistent with ISO 17034:2016 and ISO Guide 35. Certified values are accredited under Alpha Resources, LLC ISO/IEC 17025 and ISO 17034 certificates issued by ANSI National Accreditation Board (ANAB), AT-1200 and AR1920.

Table 1. Certified values for AR1946, Lot 240627.

Property	Certified Value	$U_{95\%}$	Method & Detection	n
% Carbon	51.90	1.63	Combustion/IR	35
% Hydrogen	6.26	0.22	Combustion/TC	30
Calorific Value (BTU/lb)	8874	117	Bomb Calorimetry	30

Table 2. Reference values for AR1946, Lot 240627.

Property	Value	Method & Detection
% Nitrogen	0.13	Combustion/TC
% Sulfur	0.02	Combustion/IC
% Ash	0.26	Thermogravimetry
% Volatiles	84.00	Thermogravimetry

Manufacture and Homogeneity

This product was manufactured using pulverizing and blending to minimize overall heterogeneity. Before homogenization, the material was cooled to 0°C for 72 hours and dried at 120°C for 1 hour. Samples were randomly selected using practices consistent with ISO Guide 35 Section 7. Homogeneity was evaluated by replicate analysis. Within- and between-sample variance was evaluated using Analysis of Variance (ANOVA).

Methods and References

ISO 16948:2015 – Solid biofuels – Determination of total content of carbon, hydrogen and nitrogen
ISO 16994:2016 – Solid biofuels – Determination of total content of sulfur and chlorine
ISO 18122:2022 – Solid biofuels – Determination of ash content
ISO 18123:2023 – Solid biofuels – Determination of volatile matter
ISO 18125:2017 – Solid biofuels – Determination of calorific value
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

Dustin Jenkins, Ph.D.
Global Technical Director
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ANAB
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ISO 17034
REFERENCE MATERIAL PRODUCER