Altus science Certificate of Analysis

Product Type: Total Inorganic Carbon Calibration/Verification/Standard Solution

Catalogue Number: A-51005-040

0.500 mg/L IC from NIST $NaHCO_3$

Lot Number:	A-2932602-43
Certified Value:	0.500 mg/L IC ± 0.050 mg/L IC
Expanded Uncertainty:	U= ± 10.0 %
Source Material:	NIST $NaHCO_3$ 2191a
Container:	40 mL Borosilicate Glass Vial
Storage/Refrigeration:	Store in original container at 5 °C ± 4 °C
Preservative:	N/A
Additional Information:	Please refer to SDS.
Certificate Issue Date:	21 Oct 2026
Expiry Date:	25 Dec 2026

Certifying Officer: Stephanie Thornhill
Quality Manager

Intended Use: This Certified Reference Material (CRM) is intended for use in verification and testing of a Total Organic Carbon Analyser. This CRM may be used to verify Total Carbon (TC = TIC + TOC), or for analysers that compensate for inorganic carbon (IC), to verify Total Organic Carbon (TOC = TC – IC). The expanded uncertainty value (*U*) applies to both certified parameters.

Description: The certified value was determined gravimetrically. TC Calibration Standards consist of the source material mixed with ultrapure, filtered, deionised water, with an initial TOC no greater than 0.040mg/L C at the point of production.

Instructions for Use: CRMs should be kept in the original shipping container and stored in accordance with the storage/refrigeration instructions upon receipt. Prior to use CRMs should be removed from storage, allowed to stabilise to ambient temperature and inverted three times. The single use container should remain tightly closed prior to use. Avoid contaminating open containers.

Metrological Traceability: CRMs are manufactured using the source material shown above, where applicable.

Period of Validity: Certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this CRM during the period of validity. Altus Science CRMs are intended for single use only. The fitness for purpose of the material cannot be guaranteed after single use or beyond the expiry date shown above.

Homogeneity Assessment: Homogeneity was assessed in accordance with ISO 33405:2024 [1]. Completed units were sampled using a random sampling protocol. The results of chemical analysis were then compared by Single Factor Analysis of Variance (ANOVA). Uncertainty due to the degree of homogeneity was derived using ANOVA (Homogeneity Uncertainty Contribution = $\sqrt{u^2_{Homogeneity}}$). Heterogeneity was not detected under the conditions of the ANOVA.

Uncertainty Statement: Uncertainty values in this document are expressed as Expanded Uncertainty. The reported Expanded Uncertainty is based on the combined uncertainty multiplied by a coverage factor, k= 2, providing a confidence level of 95%. The components of combined standard uncertainty include uncertainties due to characterisation, homogeneity, long term stability (storage), and short term stability (transport) as appropriate. The Expanded Uncertainty applies to the product as supplied [1, 2].

Certified Value: The Certified Value is the manufactured concentration confirmed by Altus Science. Analytical verification and acceptance criteria are set for quality acceptance of this product. This CRM is **not** ISO 17034 compliant.

Quality Standard Documentation: Altus Science (Laboratory ID: 8020) is accredited by the United Kingdom Accreditation Service (UKAS) as a Reference Material Producer to ISO 17034:2016[4], and to ISO 17025:2017 [3] as a Testing Laboratory. This CRM is **not** ISO 17034 compliant.

References

1) ISO 33405:2024(E), Reference Materials – Approaches for characterization and assessment of homogeneity and stability.
2) ISO/IEC Guide 98-3:2008, Uncertainty of Measurement – Part 3: Guide to the Expression of Uncertainty in Measurement (GUM:1995).
3) ISO/IEC 17025:2017(E), General Requirements for the Competence of Testing and Calibration laboratories.
4) ISO 17034:2016(E), General Requirements for Competence of Reference Material Producers.

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