Certificate of Analysis

300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

P: 800-669-6799/540-585-3030
F: 540-585-3012
info@inorganicventures.com

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories." Inorganic Ventures is also an ISO 9001 registered manufacturer (Amtivo Certificate Number 274357).

ACCREDITED
Testing Laboratory
Certificate 883.01

ACCREDITED
Reference Material Producer
Certificate 883.02

2.0 PRODUCT DESCRIPTION

Product Code:	**Water QC Reference Material**
Catalog Number:	QCP–CAT
Lot Number:	X2-CAT761393
Matrix:	3% (v/v) HNO_3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Analyte	Certified Value* (mg/L)	Analytical Method	NIST Traceability	Acceptance Limits** (mg/L)
Calcium	100.0 ± 0.3	ICP	SRM 3109a	111.7 - 88.3
Potassium	37.00 ± 0.16	ICP	SRM 3141a	44.40 - 29.60
Magnesium	35.00 ± 0.15	ICP	SRM 3131a	40.10 - 29.90
Sodium	85.00 ± 0.37	ICP	SRM 3152a	97.6 - 72.4

*Certified Value based on diluted solution (1:100) See Sec. 7.2
**Calculated using NELAC PT for Accreditation: Fields of Proficiency Testing with PTRLs (Non-Potable Water) October 3, 2011 & July 1, 2013

Other applicable methods include: EPA 200.7, 215.1, 242.1, 258.1 & 273.1

DENSITY OF SOLUTION (measured at 20 ± 5˚C): 1.087 **g/mL**

The Calculated Value is a value calculated from the weight of a starting material. See Section 4.2 for balance traceability.

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two Methods

Certified Value, $X_{CRM/RM}$, where two methods of characterization are used is the weighted mean of the two results:

$X_{CRM/RM} = [(w_a)(X_a) + (w_b)(X_b)]$

X_a = mean of Assay Method A with standard uncertainty $u_{char\ a}$
X_b = mean of Assay Method B with standard uncertainty $u_{char\ b}$
w_a and w_b = the weighting factors for each method calculated using the inverse square of the variance:
$w_a = (1/u_{char\ a})^2 / ((1/u_{char\ a})^2 + (1/u_{char\ b})^2))$
$w_b = (1/u_{char\ b})^2 / ((1/u_{char\ a})^2 + (1/u_{char\ b})^2))$

CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM} = k\,(u^2_{char\ a\&b} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{½}$

k = coverage factor = 2 in all cases at Inorganic Ventures
$u_{char\ a\&b} = [(w_a)^2\,(u_{char\ a})^2 + (w_b)^2\,(u_{char\ b})^2]^{½}$ where $u_{char\ a}$ and $u_{char\ b}$ are the square root of the sum of the squares of errors from characterization which include instrument measurement, density, NIST SRM uncertainty, weighing, and volume
u_{bb} = bottle to bottle homogeneity standard uncertainty
u_{lts} = long term stability standard uncertainty (storage)
u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$X_{CRM/RM}$ = mean of Assay Method A with standard uncertainty $u_{char\ a}$

CRM/RM Expanded Uncertainty (±) = $U_{CRM/RM} = k\,(u^2_{char\ a} + u^2_{bb} + u^2_{lts} + u^2_{ts})^{½}$

k = coverage factor = 2 in all cases at Inorganic Ventures
$u_{char\ a}$ = square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume
u_{bb} = bottle to bottle homogeneity standard uncertainty
u_{lts} = long term stability standard uncertainty (storage)
u_{ts} = transport stability standard uncertainty

No correction has been applied for transpiration that will occur after the CRM/RM bottle has been removed from the sealed aluminized bag. See Section 7.0 (Instructions for the Correct Use of this Reference Material) for more information.

4.0 TRACEABILITY TO NIST

4.1 Thermometer Calibration

-All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

-All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

-An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL) - N/A

6.0 INTENDED USE

6.1 This standard is intended for the calibration of analytical instruments and validation of analytical methods as appropriate. This CRM may be used in connection with EPA Methods 6010, 6020 (all versions), Standard Methods 3120 B and USP / ICH Q3D.

6.2 For products attaining traceability through Inorganic Ventures' Primary Certified Reference Materials (PCRM™) see the Limited License to Use PCRM™ in the Inorganic Ventures Terms and Conditions of Sale, https://www.inorganicventures.com/terms-and-conditions-sale. The Terms and Conditions contain information on the use of materials traceable to PCRM™ certified reference materials. This Limited License agreement is especially pertinent for laboratories accredited under ISO:17034.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

-This product can be stored at room temperature before opening and dilution. EPA method 200.7 recommends that the prepared solution (See Sec. 7.2) be analyzed within 6 months.

-While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur. It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

-After opening the sealed TCT bag keep cap tightly sealed when not in use. Do not pipette from the container. Do not return removed aliquots to container.

-For more information, visit www.inorganicventures.com/TCT.

7.2 Preparation Instructions

Carefully open container and transfer solution to a clean, dry glass or plastic container for pipetting. Pipette 10mL of the solution into a 1L volumetric flask and dilute to just below the mark with 18 megohm water. Adjust the pH to <2 with HNO_3. Dilute to the mark with 18 megohm water and mix well.

8.0 HAZARDOUS INFORMATION

-Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

-This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- Amtivo Certificate Number 274357

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

-Chemical Testing – Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

-Reference Material Producer – Accredited / A2LA Certificate Number 883.02

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

April 22, 2026

-The certification is valid within the measurement uncertainty specified, provided the CRM/RM is stored and handled in accordance with instructions given in Section 7.1. This certification is nullified if instructions in Section 7.1 are not followed or if the CRM/RM is damaged, contaminated or otherwise modified.

11.2 Period of Validity

-Sealed TCT Bag Open Date: _____

-This CRM/RM should not be used longer than one year from the date of opening the sealed TCT bag or after the date given in Section 11.3, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instruction given in Section 7.1.

11.3 Lot Expiration Date

April 22, 2031

-The date after which this CRM/RM should not be used (See Section 11.2)

-The lot expiration date reflects the period of time the stability of a CRM/RM can be supported by long-term stability studies conducted on properly stored and handled CRM/RMs.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Justin Dirico
Stock Processing Supervisor

Certificate Approved By:

Muzzammil Khan
Stock Laboratory Supervisor

Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director