

**INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."



## pH Reference Material      pH 2

Catalog No: PH-2

Lot Number: **G2-WCS02023**

### Certified Values:

Temperature °C	Certified pH
15	1.956 ± 0.023
20	1.956 ± 0.023
25	1.946 ± 0.023
30	1.936 ± 0.023

This standard is traceable to NIST SRM's 189c.

**STABILITY AND STORAGE INFORMATION** - This standard can be stored at room temperature before opening. The EPA recommends that this product should be analyzed immediately after opening. Do not put transfer devices, probes, etc. in sample container. Transfer aliquots of sample to a clean, dry, glass or plastic container for measurement. **Do not** transfer any aliquots back to the original container. Dispose of excess solution according to EPA regulations.

### **SPECIFICATIONS AND 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 interval using a coverage factor of  $k = 2$ .

#### Characterization of CRM by two independent methods

#### Characterization of CRM by one method

<p>Certified Value, <math>X_{CRM}</math>, where two methods of characterization are used, is the weighted mean of the two results = <math>[(w_a)(X_a) + (w_b)(X_b)]</math></p> <p><math>X_a</math> is the mean of Assay Method A with standard uncertainty <math>U_{char a}</math>.</p> <p><math>X_b</math> is the mean of Assay Method B with standard uncertainty <math>U_{char b}</math>.</p> <p><math>w_a</math> and <math>w_b</math> = The weighting factors for each method calculated using the inverse square of the variance:</p> $w_a = (1/U_{char a})^2 / ((1/U_{char a})^2 + (1/U_{char b})^2);$ $w_b = (1/U_{char b})^2 / ((1/U_{char a})^2 + (1/U_{char b})^2)$ <p>CRM Expanded Uncertainty (<math>\pm</math>) = <math>U_{CRM} = k (U_{char a \&amp; b}^2 + u_{bb}^2 + u_{lts}^2 + u_{sts}^2)^{1/2}</math></p> <p><math>U_{char a \&amp; b} = [(w_a)^2 (U_{char a})^2 + (w_b)^2 (U_{char b})^2]^{0.5}</math>; <math>U_{char a}</math> and <math>U_{char b}</math> are the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; <math>k</math>, coverage factor = 2 in all cases at Inorganic Ventures; <math>u_{bb}</math> = bottle to bottle homogeneity standard uncertainty; <math>u_{lts}</math> = long term stability standard uncertainty (storage); <math>u_{sts}</math> = short term stability standard uncertainty (transportation).</p>	<p>Certified Value, <math>X_{CRM}</math>, where one method of characterization is used, is the mean of individual results:</p> <p><math>X_a</math> = Mean <math>X_a</math> is the mean of Assay Method A with standard uncertainty <math>U_{char a}</math>.</p> <p>CRM Expanded Uncertainty (<math>\pm</math>) = <math>U_{CRM} = k (U_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{sts}^2)^{1/2}</math></p> <p><math>U_{char a}</math> is the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; <math>k</math>, coverage factor = 2 in all cases at Inorganic Ventures; <math>u_{bb}</math> = bottle to bottle homogeneity standard uncertainty; <math>u_{lts}</math> = long term stability standard uncertainty (storage); <math>u_{sts}</math> = short term stability standard uncertainty (transportation).</p>
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### **BALANCE CALIBRATION**

All analytical balances are calibrated yearly by an A2LA accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

### **THERMOMETER CALIBRATION**

All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

### **GLASSWARE CALIBRATION**

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

### **INTENDED USE**

For calibration

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

### **INSTRUCTIONS FOR CORRECT USE**

**Storage & Handling** - Keep **Tightly** sealed when not in use. Store and use at  $20 \pm 4^{\circ}\text{C}$ . **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

### **HAZARDOUS INFORMATION**

Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

### **HOMOGENEITY**

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

### **QUALITY STANDARD DOCUMENTATION**

- 1. ISO 9001 Quality Management System Registration**  
- SAI Global File Number 010105
- 2. ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"**  
- Chemical Testing - Accredited A2LA Certificate Number 883.01
- 3. ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"**  
- Reference Materials Production - Accredited A2LA Certificate Number 883.02
- 4. 10CFR50 Appendix B - Nuclear Regulatory Commission Facilities**  
- Domestic Licensing of Production and Utilization Facilities
- 5. 10CFR21 - Nuclear Regulatory Commission**  
- Reporting Defects and Non-Compliance

**Shelf Life** - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

**Expiration Date** - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

**Chemical Stability** - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Stability and Storage information" is followed.

**DATE OF CERTIFICATION AND PERIOD OF VALIDITY**

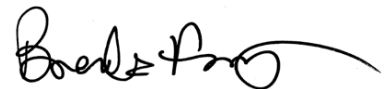
**Certification Date:** July 23, 2013

**Expiration Date:**

**NAMES AND SIGNATURES OF CERTIFYING OFFICERS**

Certificate Prepared By:

Brenda Francis, Product Documentation  
Technician



Certificate Approved By:

Elizabeth Day, Quality Assurance Specialist



Certifying Officer:

Paul Gaines, PhD., Senior Technical Director

