



CERTIFICATE OF ANALYSIS

Complies with ISO Guide 34, ISO Guide 31,
ISO Guide 35, and ISO 9001



TRACEABLE® CERTIFIED REFERENCE MATERIAL

This certificate indicates traceability to standards provided by National Institute of Standards and Technology (NIST) and/or a National Standards Laboratory.

Certificate No.: 4282-6954755

Description: pH Standard **Amended Certificate**
Reference Certificate 4282-6907735

Catalog Number: 89140-180 **Lot: CC356378**

Certificate Date: July 16, 2015 **Expiration Date: July 16, 2017**

Certified Value: 9.997 pH U = ±0.010 pH (k=2) at 25°C

Certification measurements are performed under ISO Guide 34, A2LA accreditation no. 1750.02. They are traceable to recognized national and international standards via an unbroken chain of comparisons. pH is defined as the negative logarithm of the hydrogen ion activity.

MEASUREMENT: Twelve (12) 100 ml samples were measured from this lot. The pH of each sample was determined using a pH meter and electrode.

UNCERTAINTY: The certified value is given as the average of the measured samples. The reported uncertainty (U) is determined from the measurement variation from sample to sample, change due to shelf life, and uncertainty of the measurement process. The value of uncertainty is multiplied by k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%. Uncertainty is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement".

METHOD: The certified reference material is produced and analyzed by Control Company. The certified reference material is comprised of deionized water, 0.025 mol/kg H2O sodium hydrogen carbonate, and 0.025 mol/kg H2O sodium carbonate.

Aaron Judice, Technical Manager

Nicol Rodriguez, Quality Manager

Traceability: Standards and Equipment Used

Description	Serial Number	Cal Due Date	Traceable Reference
Reference Material 9.9983 pH	E1404914	5/26/17	049/14
pH/Ion-Meter TC-241	658R067-N023		
pH Electrode TC-325	15037-F13		
Digital Thermometer	102008443	2/11/16	4000-6538481
Laboratory environment conditions: 26.0 °C 34 %RH 1,021 mb(hPa)			

Control Company -- 4455 Rex Road -- Friendswood, TX 77546

Tel: (281) 482 1714 Fax: (281) 482 9448 sales@control3.com www.control3.com

Control Company is an ISO Guide 34:2009 Certified Reference Material (CRM) Producer Accredited by American Association for Laboratory Accreditation (A2LA Certificate No. 1750.02). This certificate fulfills the requirements of ISO Guide 31:2000 (Reference Materials—Contents of Certificates and Labels), ISO Guide 34:2009 "Quality System Guidelines for the Production of Reference Materials", and ISO Guide 35:2006 "Certification of Reference Materials—General and Statistical Principles". Control Company is an ISO/IEC 17025:2005 Calibration Laboratory Accredited by American Association for Laboratory Accreditation (A2LA Certificate No. 1750.01). Control Company is ISO 9001:2008 Certified by DNV GL (Certificate No. CERT-01805-2006-AQ-HOU-RvA). TRACEABLE® is a registered trademark of Control 3 Inc.



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CONTAINER SIZE: This reference material is available in both a 500 ml bottle (minimum fill of 473 mls) and a 120 ml One-Shot™ (minimum fill of 100 mls).

INTENDED USE: The certified reference material is intended for the calibration of pH meters and electrodes used for pH measurement, for the validation of analytical methods, and for the preparation of working reference standards.

INSTRUCTIONS FOR USE: Open for a minimum period of time, quickly extract the sample. Remove a sample size of 100 mls. Return the cap to the sample. Rinse the electrode in a small amount of the certified reference material and discard. Sample should be stirred while being measured. Discard the reference material sample after use. Reference materials which have been opened are not protected from growth. Discard the reference material bottle or One-Shot™ under the following circumstances: if the expiration date is past due, two months after opening, or if any color, turbidity, or visible microbiological growth become evident.

pH buffers are sensitive to temperature. For measurements at a temperature other than 25°C, refer to the temperature correction table provided (reference page 3 of this certificate).

HOMOGENEITY: Twelve (12) 100 ml samples were selected from six (6) bottles for analytical control. Results from different samples showed no statistically significant differences, nor was there any correlation between values obtained and the bottling sequence. Bottle-to-bottle (One-Shot™ to One-Shot™) variations of the samples measured are included as a part of the calculated measurement uncertainty stated on page 1 of this certificate. A minimum sample size of 100 mls should be used to maintain the certified value and the associated statement of uncertainty.

STABILITY STUDY: The expiration date stated on page 1 indicates the period of time over which the certified reference material stored under environmentally controlled and monitored conditions in an unused and unopened package remains within the specified uncertainty range. Stability tests take place at six month intervals over the certification period of the certified reference material. Each test, two (2) 100 ml samples are taken from each of three (3) bottles and then measured to study stability over time. The most significant contributor to instability is carbon dioxide absorption. The long term stability of the certified reference material over the certification period is included in the uncertainty calculation.

EXPIRATION DATE: The date after which a certified reference material should be discarded.

STORAGE: Store below 40°C (104°F) and above 4°C (40°F).

SHIPPING: Ship below 50°C (122°F) and above 4°C (40°F).

MAINTENANCE OF CERTIFICATION: Control Company monitors representative samples from this lot over the period of its certification. If a change occurs that affects the certification before the expiration date, Control Company posts amended certificates at www.control3.com/crmupdate.htm.

MSDS INFORMATION: Please refer to the Material Safety Data sheet for information regarding this certified reference material at www.control3.com (Search MSDS). Use only the first four digits of the certificate number to locate the MSDS.

QUALITY STANDARD DOCUMENTATION:

ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories, accredited A2LA Certificate Number 1750.01.

ISO Guide 31:2000 Reference Materials—Contents of Certificates and Labels.

ISO Guide 34:2009 General Requirements for the Competence of Reference Material Producers, accredited A2LA Certificate Number 1750.02.

ISO Guide 35:2006 Certification of Reference Materials—General and Statistical Principals.

ISO 9001:2008 Quality Management System Registration—DNV GL Certificate Number CERT-01805-2006-AQ-HOU-RvA

ANSI/NCSL Z540-1:1994 Calibration Laboratories and Measuring and Test Equipment-General Requirements.

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Temperature Correction Information

Use the chart below only for making absolute measurements. That is, measurements without any automatic temperature correction (temperature coefficient set to 0).

pH Temperature Chart for this Lot

	0.0°C	0.1°C	0.2°C	0.3°C	0.4°C	0.5°C	0.6°C	0.7°C	0.8°C	0.9°C
18°C	10.069	10.068	10.067	10.066	10.065	10.063	10.062	10.061	10.060	10.059
19°C	10.058	10.057	10.056	10.055	10.054	10.053	10.052	10.051	10.050	10.048
20°C	10.047	10.046	10.045	10.044	10.043	10.042	10.041	10.040	10.039	10.038
21°C	10.037	10.036	10.035	10.034	10.033	10.032	10.031	10.030	10.029	10.028
22°C	10.027	10.026	10.025	10.024	10.023	10.022	10.021	10.020	10.019	10.018
23°C	10.017	10.016	10.015	10.014	10.013	10.012	10.011	10.010	10.009	10.008
24°C	10.007	10.006	10.005	10.004	10.003	10.002	10.001	10.000	9.999	9.998
25°C	9.997	9.996	9.995	9.994	9.993	9.992	9.991	9.990	9.989	9.988
26°C	9.987	9.986	9.986	9.985	9.984	9.983	9.982	9.981	9.980	9.979
27°C	9.978	9.977	9.976	9.975	9.974	9.974	9.973	9.972	9.971	9.970
28°C	9.969	9.968	9.967	9.966	9.965	9.965	9.964	9.963	9.962	9.961

The above data are derived values based upon IUPAC data (Pure and Applied Chemistry 74, 2169-2200) and data/algorithm obtained using a temperature controlled calibration bath.

Shown on the chart is temperature (in the far left column) in whole degrees. Shown across the top row is temperature in tenths of a degree. Using a thermometer, measure the temperature of this certified reference material. Locate the measured temperature in whole numbers on the far left column. Follow across the row to the temperature in tenths of a degree. At the intersection is the certified reference material value at that specific temperature. Standardize the meter using that value.

Example: Measured temperature is 24.5°C. Find 24°C in the far left column, find the row 0.5°C. Where 24°C and 0.5°C intersect, read the value in pH.

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