



**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 (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

**Amended Certificate**  
**Reference Certificate 4069-7926968**

**Certificate No.:** 4069-8155506

**Description:** Conductivity Standard 99,936  $\mu\text{S/cm}$

**Catalog Number:** 4069 **Lot:** CC15256

**Certificate Date:** September 1, 2016 **Expiration Date:** September 1, 2017

**Certified Value:** 99,936  $\mu\text{S/cm}$   $U = \pm 360 \mu\text{S/cm} (k=2)$  at 25°C

**Derived Values:** 99936 micromho/cm, 10.01 ohm-cm, 66624 PPM D.S.

Certification measurements are performed under ISO Guide 34, A2LA accreditation no. 1750.02 and are traceable to recognized national and international standards via an unbroken chain of comparisons. Electrical conductance is the reciprocal of electrical impedance. The International System of units (SI), derived unit of conductance, is Siemens (S), also referred to as (mhos) the reciprocal of ohms. The certified value is expressed in microsiemens per centimeter ( $\mu\text{S/cm}$ ).

MEASUREMENT: Ten (10) 100 ml samples were measured from this lot. The conductivity of each sample was derived from a measurement of the impedance of the solution using a conductivity meter and calibrated cell. The cell and sample were temperature controlled by submersion in a water bath at 25°C  $\pm$  0.015°C.

UNCERTAINTY: The certified value is given as the average of the measured samples. The reported expanded uncertainty (U) is determined from the measurement variation from sample to sample, change due to shelf life, and from the 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" (GUM).

METHOD: The certified reference material is prepared and analyzed by Control Company. The certified reference material consists of a mixture of a dilute solution of less than 8% (by mass) potassium chloride (KCL), of less than 2% (by mass) propanol, and of less than 94% (by mass) deionized water in equilibrium with atmospheric carbon dioxide. Mixing was performed by circulation utilizing a proprietary method.

  
 Aaron Judice, Technical Manager

  
 Nicol Rodriguez, Quality Manager

**Traceability: Standards and Equipment Used**

Description	Serial Number	Due Date	Traceable Reference
Conductivity Probe (4W)/ Meter	10124-F02	9/09/16	TC26-7501964
Digital Thermometer	140073819	2/03/17	4000-7392222
Calibration Bath TC-337	B5C477		

**Laboratory environment conditions:** 25.0°C 49%RH 1,012mb/hPa

**CONTROL COMPANY 12554 Old Galveston RD Suite B230 Webster TX 77598 USA**  
**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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**PACKAGING:** This material is available in both a 460 ml bottle and a 100 ml One-Shot™.

**INTENDED USE:** The certified reference material is intended for the calibration of conductivity cell constants, for conductivity measurement, for the validation of analytical methods, and for the preparation of working reference standards.

**INSTRUCTIONS FOR USE:** The certified reference material should be open for the minimum time. Rinse the cell in a small amount of the certified reference material and discard. The recommended sample size for measurement is 100 ml. Discard the standard after use and under the following circumstances: if the expiration date is past due, four months after opening, or if any color, turbidity, or visible microbiological growth become evident. Standards which have been opened are not protected from growth. Do not return used solution to this standard. Contaminates and evaporation have a significant effect on conductivity. Keep the standard closed. Keep the standard stored at a stable temperature. Select a standard as near as possible to that of the unknown solution to be measured. Do not standardize at 10,000 uS and then measure unknowns at 100 uS. Reference any accompanying instructions shipped with this product.

Temperature has a significant effect on conductivity. For measurements at a temperature other than 25°C, refer to the temperature correction table provided. This product should be used as near as possible to 25°C.

**HOMOGENEITY:** Ten (10) 100 ml samples were selected 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 ml should be used to maintain the certified value and the associated statement of uncertainty. This standard as formulated is considered infinitely soluble.

**STABILITY, SHELF LIFE:** The expiration date stated on page 1 indicates the period of time which the certified reference material in a properly packaged, unopened, unused, and stored under environmentally controlled and monitored conditions remains within the specified uncertainty range.

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

**STORAGE:** Store below 40°C and above 0°C.

**SHIPPING:** Ship below 50°C and above 0°C.

**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](http://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](http://www.control3.com) (Search MSDS). Use only the first four digits of the certificate number to locate the MSDS.

**QUALITY STANDARD DOCUMENTATION:**

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

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

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

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

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

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

**SUPPORTED METHODS:** This certified reference material meets test requirements for Federal, State, and local agencies, CAP, CLSI, ACS, and CLIA. Traceable® Certified Reference Material complies with and is essential for use in these official methods: AOAC 973.40, EPA 120.1, Standard Method 2510 (APHA, AWWA, WEF), ISO 7888, DIN 38404, ASTM D1125, USGS I-1780, USP 645, OIML R56, IUPAC, and for A2LA/NVLAP accreditations /ISO 9000 certifications. Material may be used to calibrate all conductivity meters and to determine all conductivity cell constants.

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Temperature Correction Information 1.780 %

If your conductivity meter allows you to set a temperature coefficient (temperature correction) then the underlined number shown above is the best approximation for this specific analysis for this specific Traceable® Certified Reference Material. For more precise measurements use the chart. Use the chart below only for making absolute measurements. That is, measurements without any automatic temperature correction (temperature coefficient set to 0). The chart below displays derived values.

Using a thermometer, measure the temperature of this certified reference material. 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. Locate the measured temperature in whole numbers on the far left column, and then 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 your meter using that value. Example: Measured temperature is 25.0°C. Find 25°C in the far left column, find the row 0.0°C. Where 25°C and 0.0°C intersect, read the value in microsiemens/cm.

**Temperature Correction Chart in microsiemens/cm**

	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
02°C	60624	60786	60949	61111	61274	61436	61599	61762	61925	62088
03°C	62251	62414	62577	62740	62903	63067	63230	63394	63557	63721
04°C	63885	64049	64212	64376	64540	64705	64869	65033	65197	65362
05°C	65526	65691	65855	66020	66185	66350	66515	66680	66845	67010
06°C	67175	67340	67506	67671	67837	68002	68168	68334	68500	68666
07°C	68832	68998	69164	69330	69496	69663	69829	69995	70162	70329
08°C	70495	70662	70829	70996	71163	71330	71497	71665	71832	71999
09°C	72167	72334	72502	72670	72837	73005	73173	73341	73509	73677
10°C	73845	74014	74182	74350	74519	74688	74856	75025	75194	75363
11°C	75532	75701	75870	76039	76208	76377	76547	76716	76886	77056
12°C	77225	77395	77565	77735	77905	78075	78245	78415	78586	78756
13°C	78926	79097	79267	79438	79609	79780	79951	80122	80293	80464
14°C	80635	80806	80977	81149	81320	81492	81664	81835	82007	82179
15°C	82351	82523	82695	82867	83039	83212	83384	83556	83729	83902
16°C	84074	84247	84420	84593	84766	84939	85112	85285	85458	85632
17°C	85805	85979	86152	86326	86500	86673	86847	87021	87195	87369
18°C	87543	87718	87892	88066	88241	88415	88590	88765	88940	89114
19°C	89289	89464	89639	89814	89990	90165	90340	90516	90691	90867
20°C	91042	91218	91394	91570	91746	91922	92098	92274	92450	92627
21°C	92803	92980	93156	93333	93510	93686	93863	94040	94217	94394
22°C	94571	94749	94926	95103	95281	95458	95636	95813	95991	96169
23°C	96347	96525	96703	96881	97059	97237	97416	97594	97773	97951
24°C	98130	98309	98487	98666	98845	99024	99203	99382	99562	99741
25°C	99936	100100	100279	100459	100639	100818	100998	101178	101358	101538
26°C	101718	101899	102079	102259	102440	102620	102801	102981	103162	103343
27°C	103524	103705	103886	104067	104248	104429	104610	104792	104973	105155
28°C	105337	105518	105700	105882	106064	106246	106428	106610	106792	106974
29°C	107157	107339	107522	107704	107887	108070	108253	108435	108618	108801
30°C	108985	109168	109351	109534	109718	109901	110085	110268	110452	110636
31°C	110820	111004	111188	111372	111556	111740	111924	112109	112293	112478
32°C	112662	112847	113032	113217	113401	113586	113771	113957	114142	114327
33°C	114512	114698	114883	115069	115254	115440	115626	115812	115998	116184
34°C	116370	116556	116742	116929	117115	117301	117488	117675	117861	118048
35°C	118235	118422	118609	118796	118983	119170	119357	119545	119732	119920

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