



**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 4069-7875932**

**Certificate No.:** 4069-8161377

**Description:** Conductivity Standard 99,899 µS/cm

**Catalog Number:** 4069 **Lot:** CC15165

**Certificate Date:** August 11, 2016 **Expiration Date:** August 11, 2017

**Certified Value:** 99,899 µS/cm U = ±370 µS/cm (k=2) at 25°C

**Derived Values:** 99899 micromho/cm, 10.01 ohm-cm, 66599 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 (µS/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 ± 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 1,013mb/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	60602	60764	60926	61089	61251	61414	61576	61739	61902	62065
03°C	62228	62391	62554	62717	62880	63043	63207	63370	63534	63697
04°C	63861	64025	64189	64353	64517	64681	64845	65009	65173	65338
05°C	65502	65666	65831	65996	66160	66325	66490	66655	66820	66985
06°C	67150	67316	67481	67646	67812	67977	68143	68309	68474	68640
07°C	68806	68972	69138	69304	69470	69637	69803	69970	70136	70303
08°C	70469	70636	70803	70970	71137	71304	71471	71638	71805	71973
09°C	72140	72307	72475	72643	72810	72978	73146	73314	73482	73650
10°C	73818	73986	74155	74323	74491	74660	74829	74997	75166	75335
11°C	75504	75673	75842	76011	76180	76349	76519	76688	76857	77027
12°C	77197	77366	77536	77706	77876	78046	78216	78386	78556	78727
13°C	78897	79068	79238	79409	79579	79750	79921	80092	80263	80434
14°C	80605	80776	80947	81119	81290	81462	81633	81805	81977	82148
15°C	82320	82492	82664	82836	83009	83181	83353	83526	83698	83871
16°C	84043	84216	84389	84561	84734	84907	85080	85254	85427	85600
17°C	85773	85947	86120	86294	86468	86641	86815	86989	87163	87337
18°C	87511	87685	87860	88034	88208	88383	88557	88732	88907	89081
19°C	89256	89431	89606	89781	89956	90132	90307	90482	90658	90833
20°C	91009	91184	91360	91536	91712	91888	92064	92240	92416	92592
21°C	92769	92945	93122	93298	93475	93652	93828	94005	94182	94359
22°C	94536	94713	94891	95068	95245	95423	95600	95778	95956	96133
23°C	96311	96489	96667	96845	97023	97201	97380	97558	97737	97915
24°C	98094	98272	98451	98630	98809	98988	99167	99346	99525	99704
25°C	99899	100063	100242	100422	100601	100781	100961	101141	101321	101501
26°C	101681	101861	102041	102221	102402	102582	102763	102943	103124	103305
27°C	103485	103666	103847	104028	104209	104391	104572	104753	104934	105116
28°C	105298	105479	105661	105843	106024	106206	106388	106570	106753	106935
29°C	107117	107299	107482	107664	107847	108030	108212	108395	108578	108761
30°C	108944	109127	109310	109494	109677	109860	110044	110228	110411	110595
31°C	110779	110963	111146	111330	111515	111699	111883	112067	112252	112436
32°C	112621	112805	112990	113175	113359	113544	113729	113914	114099	114285
33°C	114470	114655	114841	115026	115212	115397	115583	115769	115955	116141
34°C	116327	116513	116699	116885	117072	117258	117444	117631	117818	118004
35°C	118191	118378	118565	118752	118939	119126	119313	119501	119688	119875

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