



**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 4179-7934049**

**Certificate No.:** 4179-8151699

**Description:** Conductivity Standard 99,992 µS/cm

**Catalog Number:** 4179 **Lot:** CC15263

**Certificate Date:** September 6, 2016 **Expiration Date:** September 6, 2017

**Certified Value:** 99,992 µS/cm U = ±370 µS/cm (k=2) at 25°C

**Derived Values:** 99992 micromho/cm, 10.00 ohm-cm, 66661 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 52%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	60658	60820	60983	61146	61308	61471	61634	61797	61959	62122
03°C	62286	62449	62612	62775	62939	63102	63266	63429	63593	63757
04°C	63921	64084	64248	64412	64577	64741	64905	65069	65234	65398
05°C	65563	65728	65892	66057	66222	66387	66552	66717	66882	67047
06°C	67213	67378	67544	67709	67875	68041	68206	68372	68538	68704
07°C	68870	69036	69202	69369	69535	69702	69868	70035	70201	70368
08°C	70535	70702	70869	71036	71203	71370	71537	71705	71872	72040
09°C	72207	72375	72542	72710	72878	73046	73214	73382	73550	73718
10°C	73887	74055	74224	74392	74561	74729	74898	75067	75236	75405
11°C	75574	75743	75912	76082	76251	76420	76590	76759	76929	77099
12°C	77269	77438	77608	77778	77948	78119	78289	78459	78630	78800
13°C	78971	79141	79312	79483	79653	79824	79995	80166	80338	80509
14°C	80680	80851	81023	81194	81366	81538	81709	81881	82053	82225
15°C	82397	82569	82741	82914	83086	83258	83431	83603	83776	83949
16°C	84121	84294	84467	84640	84813	84986	85160	85333	85506	85680
17°C	85853	86027	86200	86374	86548	86722	86896	87070	87244	87418
18°C	87593	87767	87941	88116	88290	88465	88640	88814	88989	89164
19°C	89339	89514	89690	89865	90040	90215	90391	90566	90742	90918
20°C	91094	91269	91445	91621	91797	91973	92150	92326	92502	92679
21°C	92855	93032	93208	93385	93562	93739	93916	94093	94270	94447
22°C	94624	94802	94979	95156	95334	95512	95689	95867	96045	96223
23°C	96401	96579	96757	96935	97114	97292	97470	97649	97827	98006
24°C	98185	98364	98543	98722	98901	99080	99259	99438	99617	99797
25°C	99992	100156	100336	100515	100695	100875	101055	101235	101415	101595
26°C	101775	101956	102136	102316	102497	102678	102858	103039	103220	103401
27°C	103582	103763	103944	104125	104306	104488	104669	104851	105032	105214
28°C	105396	105577	105759	105941	106123	106305	106487	106670	106852	107034
29°C	107217	107399	107582	107765	107947	108130	108313	108496	108679	108862
30°C	109046	109229	109412	109596	109779	109963	110146	110330	110514	110698
31°C	110882	111066	111250	111434	111618	111803	111987	112172	112356	112541
32°C	112725	112910	113095	113280	113465	113650	113835	114020	114206	114391
33°C	114577	114762	114948	115133	115319	115505	115691	115877	116063	116249
34°C	116435	116621	116808	116994	117181	117367	117554	117741	117927	118114
35°C	118301	118488	118675	118862	119050	119237	119424	119612	119799	119987

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