



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 4068-8032857

Certificate No.: 4068-8161350

Description: Conductivity Standard 10,006 µS/cm

Catalog Number: 4068 **Lot:** CC15397

Certificate Date: October 12, 2016 **Expiration Date:** October 12, 2017

Certified Value: 10,006 µS/cm U = ±41 µS/cm (k=2) at 25°C

Derived Values: 10006 micromho/cm, 99.9 ohm-cm, 6671 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 0.1% (by mass) potassium chloride (KCL), of less than 1% (by mass) propanol, and of less than 99% (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	876-11-003	3/08/17	TC25-7948971
Digital Thermometer	111879346	4/06/17	4000-7560797
Calibration Bath TC-337	B5C477		

Laboratory environment conditions: 25.0°C 58%RH 1,018mb/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.

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 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 1.922 %

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	5718	5736	5754	5771	5789	5807	5825	5843	5861	5879
03°C	5897	5915	5933	5951	5969	5987	6005	6023	6041	6060
04°C	6078	6096	6114	6132	6150	6168	6186	6204	6222	6240
05°C	6258	6277	6295	6313	6331	6349	6367	6385	6404	6422
06°C	6440	6458	6476	6495	6513	6531	6549	6567	6586	6604
07°C	6622	6640	6659	6677	6695	6713	6732	6750	6768	6787
08°C	6805	6823	6841	6860	6878	6896	6915	6933	6951	6970
09°C	6988	7007	7025	7043	7062	7080	7098	7117	7135	7154
10°C	7172	7191	7209	7227	7246	7264	7283	7301	7320	7338
11°C	7357	7375	7394	7412	7431	7449	7468	7486	7505	7523
12°C	7542	7561	7579	7598	7616	7635	7653	7672	7691	7709
13°C	7728	7746	7765	7784	7802	7821	7840	7858	7877	7896
14°C	7914	7933	7952	7970	7989	8008	8026	8045	8064	8083
15°C	8101	8120	8139	8158	8176	8195	8214	8233	8251	8270
16°C	8289	8308	8327	8345	8364	8383	8402	8421	8440	8458
17°C	8477	8496	8515	8534	8553	8572	8591	8609	8628	8647
18°C	8666	8685	8704	8723	8742	8761	8780	8799	8818	8837
19°C	8856	8875	8894	8913	8932	8951	8970	8989	9008	9027
20°C	9046	9065	9084	9103	9122	9141	9160	9179	9198	9218
21°C	9237	9256	9275	9294	9313	9332	9351	9371	9390	9409
22°C	9428	9447	9466	9486	9505	9524	9543	9562	9582	9601
23°C	9620	9639	9658	9678	9697	9716	9736	9755	9774	9793
24°C	9813	9832	9851	9871	9890	9909	9929	9948	9967	9987
25°C	10006	10025	10045	10064	10083	10103	10122	10142	10161	10180
26°C	10200	10219	10239	10258	10277	10297	10316	10336	10355	10375
27°C	10394	10414	10433	10453	10472	10492	10511	10531	10550	10570
28°C	10589	10609	10628	10648	10668	10687	10707	10726	10746	10765
29°C	10785	10805	10824	10844	10863	10883	10903	10922	10942	10962
30°C	10981	11001	11021	11040	11060	11080	11099	11119	11139	11159
31°C	11178	11198	11218	11237	11257	11277	11297	11316	11336	11356
32°C	11376	11396	11415	11435	11455	11475	11495	11514	11534	11554
33°C	11574	11594	11614	11634	11653	11673	11693	11713	11733	11753
34°C	11773	11793	11813	11833	11852	11872	11892	11912	11932	11952
35°C	11972	11992	12012	12032	12052	12072	12092	12112	12132	12152

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