



**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.

<b>Certificate No.:</b>	<b>4068-8161002</b>	<b>Amended Certificate</b>
		<b>Reference Certificate 4068-7781143</b>
<b>Description:</b>	<b>Conductivity Standard</b>	<b>10,043 µS/cm</b>
<b>Catalog Number:</b>	<b>23226-625</b>	<b>Lot: CC15085</b>
<b>Certificate Date:</b>	<b>July 8, 2016</b>	<b>Expiration Date: July 8, 2017</b>
<b>Certified Value:</b>	<b>10,043 µS/cm U = ±41 µS/cm (k=2) at 25°C</b>	
<b>Derived Values:</b>	<b>10043 micromho/cm, 99.6 ohm-cm, 6695 PPM D.S.</b>	

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	9/09/16	TC25-7501962
Digital Thermometer	111879346	4/06/17	4000-7560797
Calibration Bath TC-337	B5C477		

**Laboratory environment conditions:** 25.0°C 57%RH 1,014mb/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 1.922 %

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	5739	5757	5775	5793	5811	5829	5847	5865	5883	5901
03°C	5919	5937	5955	5973	5991	6010	6028	6046	6064	6082
04°C	6100	6118	6136	6154	6173	6191	6209	6227	6245	6263
05°C	6282	6300	6318	6336	6354	6373	6391	6409	6427	6446
06°C	6464	6482	6500	6519	6537	6555	6573	6592	6610	6628
07°C	6647	6665	6683	6702	6720	6738	6757	6775	6793	6812
08°C	6830	6848	6867	6885	6904	6922	6940	6959	6977	6996
09°C	7014	7032	7051	7069	7088	7106	7125	7143	7162	7180
10°C	7199	7217	7236	7254	7273	7291	7310	7328	7347	7365
11°C	7384	7403	7421	7440	7458	7477	7495	7514	7533	7551
12°C	7570	7588	7607	7626	7644	7663	7682	7700	7719	7738
13°C	7756	7775	7794	7812	7831	7850	7869	7887	7906	7925
14°C	7943	7962	7981	8000	8019	8037	8056	8075	8094	8112
15°C	8131	8150	8169	8188	8207	8225	8244	8263	8282	8301
16°C	8320	8338	8357	8376	8395	8414	8433	8452	8471	8490
17°C	8509	8528	8546	8565	8584	8603	8622	8641	8660	8679
18°C	8698	8717	8736	8755	8774	8793	8812	8831	8850	8869
19°C	8888	8908	8927	8946	8965	8984	9003	9022	9041	9060
20°C	9079	9098	9118	9137	9156	9175	9194	9213	9232	9252
21°C	9271	9290	9309	9328	9348	9367	9386	9405	9424	9444
22°C	9463	9482	9501	9521	9540	9559	9578	9598	9617	9636
23°C	9656	9675	9694	9714	9733	9752	9772	9791	9810	9830
24°C	9849	9868	9888	9907	9926	9946	9965	9985	10004	10023
25°C	10043	10062	10082	10101	10121	10140	10160	10179	10198	10218
26°C	10237	10257	10276	10296	10315	10335	10354	10374	10394	10413
27°C	10433	10452	10472	10491	10511	10530	10550	10570	10589	10609
28°C	10628	10648	10668	10687	10707	10727	10746	10766	10786	10805
29°C	10825	10845	10864	10884	10904	10923	10943	10963	10982	11002
30°C	11022	11042	11061	11081	11101	11121	11140	11160	11180	11200
31°C	11220	11239	11259	11279	11299	11319	11339	11358	11378	11398
32°C	11418	11438	11458	11478	11497	11517	11537	11557	11577	11597
33°C	11617	11637	11657	11677	11697	11716	11736	11756	11776	11796
34°C	11816	11836	11856	11876	11896	11916	11936	11956	11976	11996
35°C	12016	12037	12057	12077	12097	12117	12137	12157	12177	12197

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