



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 4069-7930744

Certificate No.: 4069-8155532

Description: Conductivity Standard 99,938 µS/cm

Catalog Number: 23226-647 **Lot:** CC15261

Certificate Date: September 2, 2016 **Expiration Date:** September 2, 2017

Certified Value: 99,938 µS/cm U = ±370 µS/cm (k=2) at 25°C

Derived Values: 99938 micromho/cm, 10.01 ohm-cm, 66625 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 59%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.

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 1.780 %

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	60625	60788	60950	61113	61275	61438	61600	61763	61926	62089
03°C	62252	62415	62578	62741	62905	63068	63231	63395	63559	63722
04°C	63886	64050	64214	64378	64542	64706	64870	65034	65199	65363
05°C	65528	65692	65857	66021	66186	66351	66516	66681	66846	67011
06°C	67176	67342	67507	67673	67838	68004	68169	68335	68501	68667
07°C	68833	68999	69165	69331	69498	69664	69830	69997	70163	70330
08°C	70497	70664	70830	70997	71164	71332	71499	71666	71833	72001
09°C	72168	72336	72503	72671	72839	73007	73174	73342	73511	73679
10°C	73847	74015	74184	74352	74520	74689	74858	75026	75195	75364
11°C	75533	75702	75871	76040	76210	76379	76548	76718	76887	77057
12°C	77227	77397	77566	77736	77906	78076	78247	78417	78587	78757
13°C	78928	79098	79269	79440	79610	79781	79952	80123	80294	80465
14°C	80636	80808	80979	81150	81322	81494	81665	81837	82009	82181
15°C	82352	82524	82697	82869	83041	83213	83386	83558	83731	83903
16°C	84076	84249	84422	84594	84767	84940	85114	85287	85460	85633
17°C	85807	85980	86154	86328	86501	86675	86849	87023	87197	87371
18°C	87545	87719	87894	88068	88243	88417	88592	88767	88941	89116
19°C	89291	89466	89641	89816	89991	90167	90342	90518	90693	90869
20°C	91044	91220	91396	91572	91748	91924	92100	92276	92452	92629
21°C	92805	92982	93158	93335	93511	93688	93865	94042	94219	94396
22°C	94573	94750	94928	95105	95283	95460	95638	95815	95993	96171
23°C	96349	96527	96705	96883	97061	97239	97418	97596	97775	97953
24°C	98132	98311	98489	98668	98847	99026	99205	99384	99564	99743
25°C	99938	100102	100281	100461	100641	100820	101000	101180	101360	101540
26°C	101720	101901	102081	102261	102442	102622	102803	102983	103164	103345
27°C	103526	103707	103888	104069	104250	104431	104613	104794	104975	105157
28°C	105339	105520	105702	105884	106066	106248	106430	106612	106794	106977
29°C	107159	107341	107524	107706	107889	108072	108255	108438	108621	108804
30°C	108987	109170	109353	109536	109720	109903	110087	110271	110454	110638
31°C	110822	111006	111190	111374	111558	111742	111927	112111	112295	112480
32°C	112665	112849	113034	113219	113404	113589	113774	113959	114144	114329
33°C	114515	114700	114886	115071	115257	115443	115628	115814	116000	116186
34°C	116372	116558	116745	116931	117117	117304	117490	117677	117864	118050
35°C	118237	118424	118611	118798	118985	119173	119360	119547	119735	119922

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