A2LA ACCREDITED
A2LA Certificate No. 1750.02
Reference Material Producer

CERTIFICATE OF ANALYSIS
Complies with ISO 17034, 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.

Certificate No.: **4162-12111820** *Amended Certificate : 4162-11576621*

Description: **Conductivity Solution 200000 µS/cm**

Catalog Number: **1222W08,** **Lot : CC20329**

Certificate Date: **29 Sep 2020** **Expiration Date:** **29 Sep 2021**

Certified Value: **199,949 µS/cm** **U: ±510 µS/cm (k=2) at 25°C**

Derived Values: **199,949 micromho/cm, 5 ohm-cm, 133299 PPM D.S.**

Certification measurements are performed under ISO 17034, 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 Systems 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 micro Siemens per centimeter (µS/cm).

MEASUREMENT: Minimum 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 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".

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 18% (by mass) potassium chloride (KCL), of less than 2% (by mass) propanol, and of less than 84% (by mass) deionized water in equilibrium with atmospheric carbon dioxide. Mixing was performed by circulation utilizing a proprietary method.

Issue Date : 31 Mar 2021

Marisa Elms, Technical Manager

Nicol Rodriguez, Quality Manager

Traceability: Standards and Equipment Used

Description	Serial Number	Due Date	Traceable Reference
Conductivity Probe/Meter	12212-F02	01 Oct 2020	TC26-11205889
Digital Thermometer	111879346	30 Jun 2021	4000-11381331
Conductivity/pH Meter	696R059N003		
Temperature Calibration Bath	B5C477		

Laboratory Environment Conditions: 39.00%RH 24.90°C 1012mBar

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.traceable.com

Control Company is an ISO 17034:2016 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 31:2015 (Reference Materials – Contents of Certificates and Labels), ISO 17034:2016 "Quality System Guidelines for the Production of Reference Materials", and ISO Guide 35:2017 "Certification of Reference Materials – General and Statistical Principals". Control Company is an ISO/IEC 17025:2017 Calibration Laboratory Accredited by American Association for Laboratory Accreditation (A2LA Certificate No. 1750.01). Control Company is ISO 9001:2015 certified by DNV GL (Certificate No. CERT-01805-2006-AQ-HOU-ANAB). Traceable® is a registered trademark of Control 3 Inc.

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Note: 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 measure. Do not standardize at 10,000 µS and then measure unknowns at 100 µS. 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 25°C.

HOMOGENEITY: Minimum 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 certificate at www.traceable.com\crmupdate.htm.

MSDS INFORMATION: Please refer to the Material Safety Data sheet for information regarding this certified reference material at www.traceable.com (Search MSDS). Use only the first four digits of the certificate number to locate the MSDS.

QUALITY STANDARD DOCUMENTATION:
ISO 17034:2016 General Requirements for the Competence of Reference Material Producers, accredited A2LA Certificate Number 1750.02.
ISO Guide 31:2015 Reference Materials – Contents of Certificates, Labels and accompanying documentation.
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 9001:2015 Quality Management System Requirements- 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: 1.648%

If your conductivity meter allows you to set a temperature coefficient (temperature correction) then the underlines 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 if you are 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 degree. Shown across the top row is temperature in tenths of a degree. Locate the measured temperature in whole numbers on the far-left column, 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 20.4 °C. Find 20 °C in the far-left column, find the row 0.4°C. Where 20 °C and 0.4°C intersect, read the value in microseimens/cm.

Temperature Correction Chart in micromhos/cm

°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
15	167293	167611	167929	168248	168566	168885	169204	169523	169843	170162
16	170481	170801	171121	171441	171761	172081	172401	172722	173043	173363
17	173684	174005	174327	174648	174970	175291	175613	175935	176257	176579
18	176902	177224	177547	177869	178192	178516	178839	179162	179486	179809
19	180133	180457	180781	181105	181430	181754	182079	182404	182728	183054
20	183379	183704	184030	184355	184681	185007	185333	185659	185986	186312
21	186639	186966	187293	187620	187947	188274	188602	188929	189257	189585
22	189913	190241	190570	190898	191227	191556	191884	192214	192543	192872
23	193202	193531	193861	194191	194521	194851	195182	195512	195843	196174
24	196504	196836	197167	197498	197830	198161	198493	198825	199157	199489
25	199949	200154	200487	200819	201152	201485	201819	202152	202485	202819
26	203153	203487	203821	204155	204489	204824	205159	205493	205828	206163
27	206498	206834	207169	207505	207841	208177	208513	208849	209185	209522
28	209858	210195	210532	210869	211206	211544	211881	212219	212557	212894
29	213233	213571	213909	214248	214586	214925	215264	215603	215942	216281
30	216621	216961	217300	217640	217980	218320	218661	219001	219342	219683
31	220024	220365	220706	221047	221389	221730	222072	222414	222756	223098
32	223441	223783	224126	224468	224811	225154	225498	225841	226184	226528
33	226872	227216	227560	227904	228248	228593	228937	229282	229627	229972
34	230317	230663	231008	231354	231699	232045	232391	232738	233084	233430
35	233777	234124	234471	234818	235165	235512	235860	236207	236555	236903

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