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.: **4173-13453710**

Description: **Conductivity Solution 1413 µS/cm**

Catalog Number: **09-328-11,11714236** **Lot : CC22845**

Certificate Date: **17 Jun 2022** **Expiration Date:** **17 Jun 2023**

Certified Value: **1,412.00 µS/cm** **U: ±4.6 µS/cm (k=2) at 25°C**

Derived Values: **1,412.00 micromho/cm, 708.22 ohm-cm, 941 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 0.1% (by mass) potassium chloride (KCL), of less than 1% (by mass) propanol, and of less than 99.5% (by mass) deionized water in equilibrium with atmospheric carbon dioxide. Mixing was performed by circulation utilizing a proprietary method.

Marisa Elms
Marisa Elms, Technical Manager

Nicol Rodriguez
Nicol Rodriguez, Quality Manager

Traceability: Standards and Equipment Used

Description	Serial Number	Due Date	Traceable Reference
Digital Thermometer	111879346	01 Jul 2022	4000-12411642
Conductivity/pH Meter	696R059N003		
Temperature Calibration Bath	B5C477		
Conductivity Probe/Meter	19273-F02	14 Sep 2022	TC38-13211547

Laboratory Environment Conditions: 39.00%RH 25.00°C 1018mBar

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:

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: 1.912%

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	1145	1147	1150	1153	1155	1158	1161	1163	1166	1169
16	1171	1174	1176	1179	1182	1184	1187	1190	1192	1195
17	1198	1200	1203	1206	1208	1211	1214	1216	1219	1222
18	1224	1227	1230	1232	1235	1238	1240	1243	1246	1248
19	1251	1254	1256	1259	1262	1264	1267	1270	1272	1275
20	1278	1280	1283	1286	1288	1291	1294	1296	1299	1302
21	1304	1307	1310	1312	1315	1318	1320	1323	1326	1328
22	1331	1334	1337	1339	1342	1345	1347	1350	1353	1355
23	1358	1361	1364	1366	1369	1372	1374	1377	1380	1382
24	1385	1388	1391	1393	1396	1399	1401	1404	1407	1410
25	1412	1415	1418	1420	1423	1426	1429	1431	1434	1437
26	1439	1442	1445	1448	1450	1453	1456	1459	1461	1464
27	1467	1470	1472	1475	1478	1480	1483	1486	1489	1491
28	1494	1497	1500	1502	1505	1508	1511	1513	1516	1519
29	1522	1525	1527	1530	1533	1536	1538	1541	1544	1547
30	1549	1552	1555	1558	1560	1563	1566	1569	1572	1574
31	1577	1580	1583	1585	1588	1591	1594	1597	1599	1602
32	1605	1608	1611	1613	1616	1619	1622	1625	1627	1630
33	1633	1636	1639	1641	1644	1647	1650	1653	1656	1658
34	1661	1664	1667	1670	1672	1675	1678	1681	1684	1687
35	1689	1692	1695	1698	1701	1704	1706	1709	1712	1715

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