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Catalog Number: 093283
Lot Number: CC24123
Certificate Date: 26 Apr 2023
Expiration Date: 26 Apr 2024
Product Description: Fisherbrand™ Traceable™ Conductivity Calibration Standards Certified Reference Material (CRM), NIST tested

Certificate of Analysis

Certified Value: 1,000.00 µS/cm U: ±4.6 µS/cm (k=2) at 25°C

Derived Values: 1,000.00 micromho/cm, 1000 ohm-cm, 667 PPM D.S.

Certification measurements are performed under ISO 17034, 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 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 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".

METHOD: The certified reference material is prepared and analyzed by our supplier. 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.

Traceability: Standards and Equipment Used

Description	Serial Number	Due Date	Traceable Reference
Digital Thermometer	111879346	28 Nov 2023	4000-13767319
Conductivity/pH Meter	696R059N018		
Temperature Calibration Bath	B5C477		
Conductivity Probe/Meter	19273-F02	24 Sep 2023	TC38-14043943

Laboratory Environment Conditions: 45.00%RH 25.00°C 1013mBar

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 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: 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: Our supplier monitors representative samples from this lot over the period of its certification. If a change occurs that affects the certification before the expiration date, our supplier posts amended certificates 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

ISO Guide 31:2015 Reference Materials- Contents of certificates, Labels and accompanying documentation.

ISO Guide 35:2006 Certification of Reference Materials- General and Statistical Principles.

ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories.

ANSI/NCSL Z540-1: 1994 Calibration Laboratories and Measuring and Test Equipment- General Requirements.

ISO 9001:2015 Quality Management System Requirements

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.

Temperature Correction Information:1.91%

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 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 microsiemens/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	811	813	814	816	818	820	822	824	826	828
16	829	831	833	835	837	839	841	843	844	846
17	848	850	852	854	856	858	859	861	863	865
18	867	869	871	873	875	876	878	880	882	884
19	886	888	890	892	893	895	897	899	901	903
20	905	907	909	910	912	914	916	918	920	922
21	924	926	928	929	931	933	935	937	939	941
22	943	945	947	948	950	952	954	956	958	960
23	962	964	966	968	969	971	973	975	977	979
24	981	983	985	987	989	991	992	994	996	998
25	1000	1002	1004	1006	1008	1010	1012	1014	1016	1018
26	1019	1021	1023	1025	1027	1029	1031	1033	1035	1037
27	1039	1041	1043	1045	1047	1049	1050	1052	1054	1056
28	1058	1060	1062	1064	1066	1068	1070	1072	1074	1076
29	1078	1080	1082	1084	1086	1088	1089	1091	1093	1095
30	1097	1099	1101	1103	1105	1107	1109	1111	1113	1115
31	1117	1119	1121	1123	1125	1127	1129	1131	1133	1135
32	1137	1139	1141	1143	1145	1147	1149	1151	1153	1155
33	1157	1159	1161	1163	1164	1166	1168	1170	1172	1174
34	1176	1178	1180	1182	1184	1186	1188	1190	1192	1194
35	1196	1198	1200	1202	1205	1207	1209	1211	1213	1215

This Certificate has been compiled with data that has been provided by the manufacturer of the product. Fisher Scientific Channel has not independently verified such data.

Elizabeth Sims

Fisher Scientific Company L.L.C.
Quality Assurance Department