



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.

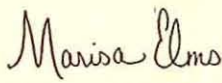
Certificate No.: 4067-12998516
Description: Conductivity Solution 1000 $\mu\text{S}/\text{cm}$
Catalog Number: 00652-28, **Lot :** CC22201
Certificate Date: 13 Jan 2022 **Expiration Date:** 13 Jan 2023
Certified Value: 998.00 $\mu\text{S}/\text{cm}$ **U:** $\pm 4.6 \mu\text{S}/\text{cm}$ ($k=2$) at 25°C
Derived Values: 998.00 micromho/cm, 1002 ohm-cm, 665 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 ($\mu\text{S}/\text{cm}$).

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 $\pm 0.015^\circ\text{C}$.

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, Technical Manager


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	15 Mar 2022	TC38-12640388

Laboratory Environment Conditions: 34.00%RH 24.90°C 1028mBar

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 Principles". 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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Temperature Correction Information:

1.914%

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	809	811	813	815	817	818	820	822	824	826
16	828	830	832	833	835	837	839	841	843	845
17	847	848	850	852	854	856	858	860	862	863
18	865	867	869	871	873	875	877	878	880	882
19	884	886	888	890	892	894	895	897	899	901
20	903	905	907	909	911	912	914	916	918	920
21	922	924	926	928	929	931	933	935	937	939
22	941	943	945	947	948	950	952	954	956	958
23	960	962	964	966	968	969	971	973	975	977
24	979	981	983	985	987	989	991	992	994	996
25	998	1000	1002	1004	1006	1008	1010	1012	1014	1015
26	1017	1019	1021	1023	1025	1027	1029	1031	1033	1035
27	1037	1039	1041	1043	1044	1046	1048	1050	1052	1054
28	1056	1058	1060	1062	1064	1066	1068	1070	1072	1074
29	1076	1078	1079	1081	1083	1085	1087	1089	1091	1093
30	1095	1097	1099	1101	1103	1105	1107	1109	1111	1113
31	1115	1117	1119	1121	1123	1125	1127	1129	1130	1132
32	1134	1136	1138	1140	1142	1144	1146	1148	1150	1152
33	1154	1156	1158	1160	1162	1164	1166	1168	1170	1172
34	1174	1176	1178	1180	1182	1184	1186	1188	1190	1192
35	1194	1196	1198	1200	1202	1204	1206	1208	1210	1212

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