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36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0.01 molal (m) and 0.1 m potassium cliloride solutions 50 (1,512 - 34 0,1667 0,3256 1,513 - 36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0.01 molal (m) and 0.1 m potassium cliloride solutions 50 (1,512 - 34 0,1667 0,3256 1,513 - 36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0.01 molal (m) and 0.1 m potassium cliloride solutions 50 (1,513 - 36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0.01 molal (m) and 0.1 m potassium cliloride solutions 50 (1,513 - 36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0,3146 (1,516 - 36 - 0,3368 1,564 - An absolute determination of aqueous electrolytic conductivity has been made for 0.01 molal (m) and 0.1 m potassium cliloride solutions 50 (1,516 - 1,516 - 1,516 - 1,516 - 1,516 - 1,5 removable center segment in the exact length and area was used for the measurements. The values have been adjusted to match the ITS-90 temperature scale. Overall uncertainty across the temperature range is estimated at 0.03%. The values at 25 °C for 0.01 and 0.1 m are 0.00140823 and 0.0128246 S/cm, respectively. It is suggested that these values be adopted as primary standards for psychic electrolyte conductivity, replacing the demal scale. Keywords: cell constant, conductivity, demal, electrolytic conductivity, molecular, potassium chloride, primary standards, resistance, specific conductivity parker [1] introduced the unit of demal to indicate the concentration scale for electrolyte conductivity standards about 60 years ago. Since then, the electrolyte conduct (specific conduct) for this unit has been subject to two major amendments. One was by Jones and Bradecho [2] about 10 years later, and the other was based on recalculations [3,4,5] due to changes in basic fixations and measurement scales, such as the International Um to Absolute Aeham, and the International Practical Temperature Scale, IPTS-48, to IPTS-68. Now, a new international temperature scale (ITS-90) has been adopted as of January 1, 1990.[6]. Therefore, the old values of the thyst standards must be changed again. In 1987, we reviewed primary and secondary conductivity standards [3] and stated that although these changes affected standard values to 0.1% or less, this is significantly greater than the claimed accuracy of the original measurements. Furthermore, the 'demal' unit is not an accepted unit of concentration in solving chemistry, and 50 years is a long time for any given standard to go without re-learning and validation. For these reasons, we re-established the primary standards in 1989, based on a conductivity cell with a well-defined geometry whose dimensions were accurately measured, and concluded that ... Future adoption of the moddle scale as the basis for Standards for specific conductivity will be desired when data for other molalities and temperatures are available [7]. We recently completed measurements of conductivity of two KCI water solutions, based on the front scale (m), wide application holder, viz., 0.01 and 0.1 m. Dimensions were made from 0 to 50°C in 5°C increments. Electrolytic conductivity (specific conductivity), n, of a given material is mutual of y, resistance. By definition when R is the resistance, I am the length and A is the out area of the given material. Therefore, if I/A is already known as measured R, y and 1/n are determined. Since the cell's determinance in the Jones-type conductivity chamber is determined by the power lines between the two electrodes, the central part of the tube can be removed to shorten the distance between the electrodes, reducing resistance. The same part can then be returned, extended the distance and increased resistance, provided the power lines are not disturbed. The difference in resistance stems from the geometry of the displacement of the central tube and the resistance (or electrolyte conductivity) of the solution in question. If the geometry of the tube, L/A, and the difference in resistance are known, electrolytic conductivity can be determined, regardless of any reference material; That way, it's absolute determination. This principle can be expressed as follows: $Rw = y(GN + I/A) = yGw(3)1/y \equiv \eta = I/A(Rw - RN)(5)$ where GN and Gw are cell constants of the center tube, respectively; I/A is the sectional area of the central tube, called the cell constant, GT; and RN and Rw are the measured resistance for the none cell and with the central tube, respectively. It should be true that the electrolytic conductivity of the solution is given, including the central tube into the cell, the cell must be cut into two halves, which can be joined together with or without the central tube. When connected, the inner diameter of the joint or joints must be effective and there must be no leakage. To meet these requirements, the length of precision carried 1 cm I.D. Pyrex1 tubes, with factory-certified uniformity, was cut into three parts. A prefabricated organ with a purpose of 1.3 cm, an O.D. of 2.5 cm and a thickness of 0.65 cm was epoxy on each of the tubes so that the face of the eigen was flush with the cut end of the flotation was ground for optical flattening. The non-menting end of each of the flocking eigen tubes was attached to the appropriate dish A cell, each of which contained a 2 cm platinum disc electrode (diameter). The electrodes were solder gold for platinum wire 2 mm that expanded through a cascading glass seal. The component parts of the cell are schematically displayed in the form of 1. To forming the cell, the ends of the mating pot were held together by a C Bakelite-shaped strap which can be slightly enlarged with a little pressure, so that both howevers fit them conveniently into it. In this way, the onuses were prevented from moving laterally. Tight and circular movements were avoided by assembling two stapled Bakelite plate along with four nylon and walnut screws. A rubber O ring was inserted between each plate and the back of the eigen. This assembly is schematically displayed in Isa 2. Each cell assembly with the holder is shown in Figure 3. From eq (5), electrolyte conductivity is determined from the cell constant, GT = I/A, of the central tube. For the cell used in this work, length L and I.D. Of the central pipeline were determined by the length and mass division of the National Institute of Standards and Technology. Average reporting values are as follows: I = 8.00046±0.00019cm, D = 1.00634±0.00005cm, A = 0.79539±0.00008cm2. So GT = I/A = 10.0585 ±0.0013 cm-1. The relative value of the uncertainty in L suggests that the two tube pots are not exactly parallel; The hinges of the tubes are turned off by a maximum of 0.02 degrees, which is determined by the accuracy limit of the devices used to fabricate the cell. The cell constant is defined as the effective length between the two electrodes across the efficient area of the electrodes, L/A. In the Jones type of cell, an effective l/A is controlled by the size of the central tube, according to eq (5). The conduct is determined precisely by the removable part of the central pipeline, That is, GT. The effect of temperature on GT can manifest [9] as $1GTdGTdt\approx 1dldt-1AdAdt=\alpha g-2\alpha g=-\alpha g(6)$ when $\alpha g=3.6 \times 10-6^{\circ}C-1$, the thermal expansion coefficient of Pyrex glass. For platinum, $\alpha pt=9 \times 10-6^{\circ}C-1$. In the entire range of experimental temperatures, that is, 0 to 50 degrees Celsius, the GT is about 0.02%. However, Gw and GN do not change in the same way as eq (6), because there are no means to determine the cell dimension of the entire cell shown in Figure 3. The only way to determine the effect of temperature on Gw and GN is through eqs (2) and (3), in a series of temperatures. At a given temperature, each of the three cell constants, Gw, GN and GT (only two of which are independent), have a fixed value that does not depend on the conductivity of a solution. Therefore, by eliminating ε from eqs (2) and (3), we obtain for all two solutions A and B at a given temperature t: (Rw/RN)A = Gw/GN = (Rw/RN)B(7) where the A and B underwrpretrials A and B solutions A or B. This consistency was validated for t = 25 °C in the previous report The same principle was applied to every temperature in the current study. Three main instruments are required for these measurements: the cabin, a fixed temperature bath for the cabin, and an AC bridge with a Null detector. The cell was described in the previous section. The fixed temperature bath is rectangular, steel, open box surrounded by a wooden cabinet with hanging cover. The space between the five sides of the steel box and the wooden cabinet, and an AC bridge with a Null detector. about 8 cm, is insulated in glass wool. Inside the steel box, there are vertical interior walls located about 5 cm from the steel box and 15 cm from the back side, which end about 10 cm from both the top and the bottom of the box. The length of 0.635 cm (0.25 inches) of copper pipes in diameter is looped twice around the outside of the interior walls, leading to the outside of the wooden cabinet to connect to a temperature-controlled liquid cycle system. 8 cm in diameter, a 25 cm trope located at the bottom of the steel box and located next to the stirrer, located at the back bottom of the steel box. This mixes forcing the bath fluid out through the thy rim and on the rim of the interior walls, resulting in good blood flow. On the front side of the steel box, two studs are installed to provide support for the chamber. The support adjusts to handle the cell where desired. The liquid formerly used for a fixed temperature bath was light petroleum oil.[7]. It performed poorly because at low temperature its viscosity increased; Air bubbles produced by Stirrer were tame, which caused no degree thermal conductivity. Temperature control is down to ± 0.02 °C. To improve viscosity and avoid trapped air, a 50-50 blend of ligic-weight oil and petroleum winds was used. Further Syringe insulation was attached to the bathroom complex. With the new liquids and insulation, the bathroom temperature was controlled to ±0.005 at 0°C, ±0.001° at 25°C and ±0.002° at 50°C. An ice bath was also tried for 0 degrees Celsius. However, oil is drawn into the cell through the joints, due to the sudden drop in temperature (from 25 to 0°C). Therefore, all reported results were achieved using a different fixed temperature oil bath. A small cryogenic bath in circulation, whose temperature was controlled to ±0.05 degrees Celsius, was used to cool the oil bath. Coolant, a mixture of ethylane glycol and water, at a constant temperature of 1.5 °C below that of the experiment, was spread by pumping through the copper coil and back to the control chamber. The heating of the oil bath was relieved with a 250 W quartz heater (Corning) submerged into the bath. In the oven circuit, the 60 W bulb was attached in the series so that the power of the oven was reduced. All Heating Unit Attached to a proportional temperature control unit that has been changed to reduce the maximum temperature bandwidth from 0.1 to 0.03 °C. Thermistor was used as a sensor for the temperature controller. The quartz thermometer and frequency pulse used as the bathroom temperature indicator was calibrated with a standard NIST thermometer to a accuracy of 1 mK. The quartz thermometer is demarced every 3 months at first. After 1-1/2 vears, the rate of drift calibration gradually decreased. After 3 years, the calibration was stable in the range of 1 to 2 mK. The laboratory'± room temperature control equipment was properly adjusted, the temperature deviation rarely exceeded ±0.005°C over an extended period, for example, overnight. However, the temperature can be easily controlled ±0.001°C during trials with minor adjustments of heating rate. This demonstrates in figure 4. The bridge was the Jones Bridge equipped with capacitance compensation specifically designed for the moligine measurements [10,11]. This bridge also employed Wagner land to minimize the effects of stray capacitance on the accuracy of the bridge was relatively old, the bridge counters were recalibrated by the NIST Electrical Department before the experiment began. The overall accuracy of the bridge was in the range of ±0.005% without repair and ±0.001% with repair, using the re-negated values. The resistance leading to connections from the bridge's binding positions to the cell electrodes was set separately and was 0.301 M. For measurements of cell resistance, the observed values read from the bridge were corrected for both lead resistance and recalibration of the bridge resistor. Intermittent current was provided to the bridge from a signal generator was modified by a secondary float of the output transformer to achieve un grounded output, which is required to make use of the Wagner ground of the Jones Bridge. Sharp (unbalanced) output was obtained from secondary development of the output transformer and used as a phase reference for the detector. The AC voltage applied to the bridge was 1.2 V RMS. Differential input coefficient, deliberate multiplier and osiloscope were used in the detector circuit. The sample's matching input maintained the balance of Wagner's soil and eliminated the need for input transformers. The tuned amplifier was used in the band transition mode at a Q of 10 to 50, as required, to sultmate the second harmonies enough and increased at the empty point. The output of the tuned amplifier and the signal from the signal generator were connected to the vertical and horizontal abrases of the osiloscope, respectively. Template shown in Oscilloscope was a Lysosic figure and was used to simultaneously indicate a capacitive and resistanceal balance of the bridge. The technique was preferable to using phase output meters and guarature of the lock lock to indicate a balance of capacitive resistance of the bridge. With this installation, a 0.0010% change in cell resistance was easily detected on the oscilloscope. Therefore, a milligram change in bath temperature (0.002% in R) was easily observed, and the uncertainty in measuring the empty point did not significantly contribut to the overall uncertainty of the measurement. The frequency generator can be powered from 20 Hz to 15 kHz. The normal operating range of the frequency co was 1 to 5 kHz. The polarization effect can be corrected by calculating R versus β -1 to $\beta = \infty$ [9]. The guartz thermometer frequency counter was connected to a digital to analog converter, the output of which would have been monitored by a track chart recorder. This installation was able to track small changes in temperature (100 milligrams on a full scale). Due to the thermal conductivity of the oil (bath liquid) and the path between the thermometer and the conductivity chamber, there was a delay in a time of 2 minutes for the two corresponding temperatures, and a minimum of 10 minutes at a constant temperature is required to ensure that the resistance reading is at the specified temperature. It also said that KCI solutions and the ease with which KCI can be purified. The KCI used was NIST Standard Reference Material (SRM) 999. The purity of this SRM was confirmed at 99.991% based on K, and 99.981% based on fine crystalline CI. KCI ignited at 500°C for 4 hours and stored in the founding before use. A group of SRM 999 KCI was redesigned twice and ignited at 500 degrees Celsius. No noticeable difference was observed in the interdecondance between the original SRM 999 and the fascinated material. SRM 999 was used so throughout, without recrystallization. The distilled water in front of the house was passed through an impressive column before use. When the water was fresh and deionized, electrolytic conductivity, ε , was 0.2 µS cm-1; After being stored in a polyethylene bottle for several days, ε was worth 1±0.1 µS cm-1, and was stable at 25 °C. Because of the CO2 content in the atmosphere, it would have been better to let the solution reach equilibrium with co2, rather than avoid CO2. At other temperatures, the co2 content was, of course, different from 25°C. Co2 equilibrium was established for each temperature after thermal riding. The electrolyte transports of water at different temperatures were determined with a cell design similar to that used by Daggett, Blair and Krauss [13], which was a cell constant of 0.055302 cm-1 at 25°C. Deviation at any given temperature was approximately ± 1%, which was less than 0.02 µS/cm, far beyond the uncertainty of experimental results for electrolyte conductivity of standard KCI solutions. Two kg were prepared each of the KCI solution of 0.01 and 0.1 m (Mol/KegbH2O) All solution weights have been repaired to vacuum. The solutions were stored in polyethylene bottles for several days to reach equilibrium with atmospheric carbon dioxide before use. When the cell was first made, it was cleaned with a chromic acid cleansing solution, washed down with water, soaked in a water bath overnight, and then a dried vacuum at room temperature. If washing the water, soaking and drying the vacuum did not remove the chromat traces, the process was repeated. Although the use of a chromic acid cleansing solution is not recommended, other strong acids and organic solvents have been tried without satisfaction. After the cell was clean and dry, it was assembled and filled with a KCI solution of 0.01 m. If no leak was detected in the umgen joints after the full cell stood for an hour, the cell was put in the bath. It usually took about 30 to 40 minutes for the cabin to reach thermal equilibrium after being put in the bath. The call was subsequently recorded. If there was no erosion for another hour, the bath was adjusted to the next temperature and the process was repeated three times. If the results variance was random within ±0.005%, an average was taken as a final result. If deviation showed a trend of increasing or diminishing resistance, there were two probable causes: cell contamination or water loss from the solution by evaporation. Cell contamination is usually caused by the absorption of foreign materials on the walls and electrodes. There was no easy way out of this other than to repeat the experiment until the foreign materials were minted and their readings were constant. If the erosion resulted from an increase in concentration, this was how a new solution was used and the experiment was repeated. (The aggiding occurred when transferring a solution from the bottle to the cell, a process that was carried out openly. since the rate of adhesion was at least 3 mm and the transfer processes took about 6 mag of water was lost, approximately 0.003% of the total volume. The procedures for changing from one concentration to another, or replacing the central tube in the cell, were similar. Caution is always exercised to prevent the oil on the outside of the cell from creeping in. If this incident occurred, the cleanup process was repeated. The bathroom temperature typically started at 25°C, and was raised or lowered in steps of 5 degrees to 50 or 0°C, then back to 25°C. The cycle resistance readings of 25-0-25 °C were reproduced within ±0.005%, while those for A cycle of 25-50-25 °C were not as good. The resistance measured for the reverse cycle from 50-25 °C was generally lower than the front cycle (25 to 50°C) due to loss of water from a cell. Therefore, only these results for the forward cycle were used in the final analysis. In addition, at high temperatures (45°C and 50 °C), small air bubbles would sometimes form in a chamber between electrodes, in which case higher resistance readings were generated. There was no easy way to get rid of the bubbles except to take out the cell and rotate it. This process usually resulted in the loss of water vapor, which ended with lower resistance calls. It's better to rotate the cabin while it was still in the bath, but it was only a third of the time successful. In most cases, the measurement had to be repeated as bubbles evolved. All of the values listed in the following tables were based on the measurements on the 1968 temperature scale (IPTS-68) from 0 to 50 °C in 5°C scales. As of this, a new international temperature scale was adopted for 1990 (ITS-90) [6]. You can describe the part of the new scale that affects our values (0 to 50 °C) as t90 - t68 = -2.6 × 10-4t. (8) The revised values for electrolyte mostitanity are listed in Table 1. Calculated cell constants, based on the development described in Section 2, are listed in Table 2. The electrolytic conductivities, K, of 0.01 m and 0.1 m KCl solutions, and of solvent are listed in table 3. Observed resistance values for 0.01 m RNARw0.1 mRNAR 024073.111067.20 13005.90 2615.85 1202.97 1412.88 520883.79601.6811282.00 2275.40 1046.22 1229.18 1018350.78436.899913.812004.06 921.461082.60 1516301.07494.658806.351784.00 820.30963.701815252.67012.398240.211671.20 768.26902.942014616.66720.067896.541603.02 737.06865.962513213.36075.007138.301451.86 667.59784.273012030.55531.436499.111324.38 608.93715.453511024.45069.105955.301215.70 559.02656.684010161.34671.805489.501122.30 515.99606.3145 9414.104328.105086.001041.47 478.82562.6550 8762.804028.904733.90970.70446.34524.36t°CGwGNGT 018.62048.5611010.0594 518.62028.5610510.05921018.62008.5610110.05901518.61988.5609610.05891818.61978.5609310.05882018.61968.5609110.05853018.61928.5608210.05833518.61908.5607710.05814018.61888.5607210.05804518.61858.5606710.05785018.61838.5606210.0576Electrolytic conductivities for 0.01 m and 0.1 m KCI solutions, IPTS-68 scale (S/cm, H2O corrected)t°C0.01 m KCIk (S/cm) 0.1 m KCIH2O 07.72921 × 10-47.11685 × 10-6 58.90932 × 10-48.18342 × 10-30.68 × 10-6101.01389 × 10-39.29113 × 10-30.79 × 10-6151.14135 × 10-31.04362 × 10-20.89 $10-6181.21981 \times 10-31.11395 \times 10-20.95 \times 10-6201.27289 \times 10-31.16147 \times 10-20.99 \times 10-6251.40805 \times 10-31.28230 \times 10-21.10 \times 10-6301.54641 \times 10-31.40573 \times 10-6351.68753 \times 10-31.53137 \times 10-21.30 \times 10-6401.83097 \times 10-31.65883 \times 10-21.40 \times 10-6451.97628 \times 1$ 10-31.78776 × 10-21.51 × 10-6502.12305 × 10-31.91775 × 10-21.61 × 10-6The temperature effect can be expressed as $\kappa 68 = a + bt + ct2 + dt3(9)$ where a, b, c, and d are temperature coefficient constants for K. הערכים שלהם עבור פתרונות KCl 0.01 א הערכים שלהם עבור 10-6502.12305 × 10-21.51 × 10-6The temperature effect can be expressed as $\kappa 68 = a + bt + ct2 + dt3(9)$ where a, b, c, and d are temperature coefficient constants for K. (9) עבור פתרונות wo.1 ma7.729 21 × 10-47.11685 × 10-3b2.30786 × 10-52.08 948 × 10-4c1.07 659 × 10-7d-1 5.83639 × 10-10 - 5.06729 × 10-9 The change of n68 in relation to t is so, the ɛ90 of the ITS-90 temperature scale will be n90 = 68 + (b + 2ct + 3dt2) × 2.6 × 10-4t. (11) The values for £90 are listed in table 5. Electrolytic Tracker for 0.01 m and 0.1 m KCI Solutions, 7116.85 5 890.9 772.921 7116.85 71 16.85 71 16.85 890.9 Io'awa 90 Yum 90 61 8183.70101013.95 9291.72151141.4510437.1181219. 9311140.6201273.0311615.9251408.2312824.6301546.6314059.2351687.7915316.0401831.2716591.0451976.6217880.6502123.4319180.9Accuracy is the requirement required for a master standard. There are four main factors that can affect the accuracy of these results, viz., 1) purity, stability, and accuracy of concentration of KCI solutions during preparation, storage, and measurement; 2) cell constants and the cleanliness of the cell; 3) Temperature control; and 4) the measuring instrumentation. From this, the latter caused the least problem ±&t; 0.± 002%). Except at 50, 5 and 0 °C, where stability decreased to ±0.003, ±0.003 and ± 0.005 °C, respectively. After that, they were stable and consistent. Most likely, this was because of the cascading glass used to seal platinum electrodes and the pyrex glass joint. It is recommended that each cell used to measure conductivity across a wide range of temperature should be subjected to the same thermal cycle before it is uguited. After that, its stability must be monitored. The uncertainty in the values of electrolyte conductivity due to measurement and maintenance of an estimated temperature should not exceed 0.01%. Keeping the cell clean wasn't a simple problem. While lowering the cell temperature, if the change was too sudden, such as from room temperature to 0 degrees Celsius, the oil could be sketched from the bathtub Cell. There was no easy way to remove the thin oil tape sticking to the cell wall other than to use chromic acid. However, the chromat yons tended adsorb to the cell. It took about two weeks to wash these ions by repeating soaking and resuming with high guality water. The clean measure of the cell may be the predominant factor in the random uncertainty in the measurement (see below). The uncertainty set in the cell is estimated at 0.02%, as discussed in Section 2.3. The accuracy of the concentration of KCI solutions, as limited by purity, stability and preparation, was estimated in the range of ±0.005%. The lesser-known effects resulted from evaporation, occupation and contamination during the transfer of a solution from stock to cell, and thermal riding from one temperature to another. The solutions were occasionally contaminated (perhaps by the cell) as known by the conduct drifting upwards. These random events could put reproduction at ±0.01 to 0.02%, so the absolute uncertainty in electrolyte conductivity values across the entire temperature range was conservatively estimated at 0.03% (determined by the base amount method of combining uncertainty). There were at least three decisions made for each temperature and concentration. Each of these points consisted of two independent measurements, one with the central tube in place and the other without the central tube. The difference in resistance between the two was used to determine electrolytic conductivity. n. as eq (5) showed. To ensure that the ɛ's obtained are consistent and accurate. eqs (2) and (3) should be used to determine the same ɛ's for verification. In section 2.5, eq (7) shows that (Rw/RN)A = (Rw/RN)B, which is the same (GW/GN)A = (GW/GN)B. It will also be true that since GT(t) = GT(25) [1 - $\alpha q(t - 25)$, (15)From the ratio of observed resistance, that is, the ratio of G, as a function of cell constant temperature, Gw and GN can be obtained by eqs (13), (14), and (15). However, both Rw and RN may be turned off by a fraction, α, that is, αRw/αRN=Rw/RN. In this case, either E or G's will be turned off by the same a factor. Statistically, we can calculate the standard deviation from each of the three elements, R, n, and G, because they are related. We chose G, because (a) it is fixed at a given temperature, (b) it is a linear function of temperature [eq (15)], (c) its change through the temperature range of 0-25 and 25 to 50°C is small, and (d) at 25°C we have accumulated additional data to ensure its demarcation. Use these constants in a smooth cell, all values for the n in the general Were recalculated and adjusted to a polynomial function of temperature using at least a square method. The final values are displayed in Table 3. The differences between the observed values and the smooth values are characters in letters 5 and 6. Finally, a new ITS-90 temperature scale was adopted in the early 1990s (after all measurements were made with the IPTS-68 temperature scale). Therefore, electrolyte conductivity values had to be adjusted to the new ITS-90 scale by eq (11). The adjusted values are displayed in Table 5. Some values at 25 and 40 °C were determined by using an ITS-90-scale ucificiate to validate the match. These values ranged from 0.01% of the adjusted values. It is recommended that you adopt the electrolytic conductivity values listed in Table 5 as the primary standards for electrolyte conductivity over the temperature range studied.1 The creator of commercial equipment, instruments, or materials identified in this paper to properly indicate the experimental procedure. This identification does not imply a recommendation or support from the National Institute of Standards and Technology, nor does it imply that the converts or equipment identified are necessarily the best available for this purpose.1 Parker HJ, Parker Ayio. J Am Chem Soc. 1924;46:312. [Google Scholar] 2. Jones G, Bradshaw B.C. J Am Chem Soc. 1933;55:1780. [Google Scholar] 3. Wu YC, Koch WF, Hammer WJ, Kay RL. J Chemical solution. 1987;16:985. [Google Scholar] 4. Standard reproductive solutions of electrolyte conductivity, 1st ed. OIML: International Bureau de Metrology Legale: Paris: June, 1980, 1981, (International Recommendation No. 56), [Google Scholar] 5. Jukes E. Marsh KN, Pure and Chemistry Appl, 1981; S3: 1844, [Google Scholar] 6. Officially adopted by Comite International de Poids et Mesures (CIPM) on September 26-28, 1989, meeting at the International Bureau de Foyd et Mesures (BIPM).7. Wu YC, Pratt KW, Koch WF. J Chemical solution. 1989;18:515. [Google Scholar] In this reference there are two incorrect prints in Table I: row 1, the last column, should read 0.0128516, row number 3, the number in parentheses should read 0.1 m.8. Wu. C, and Coch, W.P., will be published.9. Robinson RA, RH Stokes. Electrolyte solutions. 3Ad Butterworths; London: 1959. [Google Scholar]10. Jones G. Joseph R.C. J Am Chem Soc. 1928:50:1049. [Google Scholar]11. PH. Rev Sci Musical Instruments. 1931:2:379. [Google Scholar]12. 2000-2012. Rev Sci musical instrument. 1938:9:272. [Google Scholar]13. HM Daggett. Baver EJ. Krauss CA. J Am Chem Soc. 1951:73:799. [Google scholar]v] scholar]v]

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