National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 5121-a03
No. +++

Electrolytic Conductivity Standard Solution
Aqueous Solution of Potassium Chloride (1 mol kg\(^{-1}\))

This certified reference material (CRM) was produced in accordance with the NMIJ’s management system and in compliance with ISO GUIDE 34:2009 and ISO/IEC 17025:2005. This CRM is intended for use in calibration of electrolytic conductivity.

Certified Value
The certified value of this CRM is given in the table below. The uncertainty of the certified value is the half-width of the expanded uncertainty interval calculated using a coverage factor (k) of 2, which gives a level of confidence of approximately 95%.

<table>
<thead>
<tr>
<th>Electrolytic Conductivity (25 °C)</th>
<th>Certified value, S m(^{-1})</th>
<th>Expanded uncertainty, S m(^{-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.847</td>
<td>0.057</td>
</tr>
</tbody>
</table>

Analysis
The certified value of this CRM was determined from measurements of the geometry (length and cross-sectional area) of the glass cell for electrolytic conductivity and the impedance of the solution.

Metrological Traceability
The certified value of this CRM was determined on an absolute basis; the geometry (length and cross-sectional area) of the glass cell for electrolytic conductivity was calibrated with the coordinate measuring machine of NMIJ traceable to the International System of Units (SI), and a LCR meter for impedance measurements was calibrated on Japan Calibration Service System (JCSS). Therefore, the certified value is traceable to the SI.

Expiration of Certification
This certificate is valid for six months from the date of shipment or until June 25, 2018, whichever comes earlier, provided that the material remains unopened and stored in accordance with the instructions given in this certificate.

Sample Form
This CRM is in the form of a colorless solution. The net volume of this CRM is ca. 250 mL, in a glass bottle.

Homogeneity
The electrolytic conductivities of several solutions subdivided from the originally prepared solution were compared with each other. The repeatability was combined into the uncertainty of the certified value as the homogeneity. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage
The solution of this CRM should be kept in the glass bottle. This CRM should be kept in a clean atmosphere at 15 °C to 30 °C.
Instructions for Use
The certified value of this CRM is electrolytic conductivity exactly at 25 °C within its uncertainty. Electrolytic conductivity typically changes by 2 % per 1 °C around at 25 °C; measurement uncertainty should be appropriately evaluated depending on the laboratory circumstances. The bottle of this CRM should be allowed to warm to room temperature before opening. Prior to use, the bottle should be shaken gently to avoid the formation of air bubbles. This CRM should be promptly used once a bottle is opened.

Precautions for Handling
Refer to the safety data sheet (SDS) on this material before use.

Preparation Method
The prescribed amounts of potassium chloride were dissolved in the prescribed amount of pure water; the nominal molality is 1 mol kg\(^{-1}\). The solution was in equilibrium with atmospheric carbon dioxide, and divided among several glass bottles of 250 mL.

NMIJ Analysts
The technical manager for this CRM is T. Miura, the production manager is T. Asakai, and the analysts are I. Maksimov, S. Onuma, T. Suzuki and T. Asakai.

Technical Information
Customer registration on the NMIJ Website (given below) will facilitate notification of any revision of the information given above. Technical reports regarding this CRM can be obtained from the contact details given below.

Reproduction of Certificate
In reproducing this certificate, it should be clearly indicated that the document is a copy.

November 22, 2016

Ryoji Chubachi
President
National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact:
National Institute of Advanced Industrial Science and Technology,
National Metrology Institute of Japan,
Center for Quality Management of Metrology, Reference Materials Office,
1-1-1 Umezono, Tsukuba, Ibaraki 305-8563, Japan
Phone: +81-29-861-4059; Fax: +81-29-861-4009; https://www.nmij.jp/english/service/C/