

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 5122-a03

No. +++

Electrolytic Conductivity Standard Solution  
Aqueous Solution of Potassium Chloride ( $0.1 \text{ mol kg}^{-1}$ )

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 electrolytic conductivity calibration.

**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 %.

	Certified value, $\text{S m}^{-1}$	Expanded uncertainty, $\text{S m}^{-1}$
Electrolytic Conductivity ( $25^\circ\text{C}$ )	1.2804	0.0045

**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 at  $25.000^\circ\text{C} \pm 0.014^\circ\text{C}$  ( $k=2$ ).

**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 a 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.

**Mutual Recognition Arrangement under Meter Convention**

This certificate is consistent with the calibration and measurement capabilities (CMCs) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures (CIPM). Under the MRA, all participating institutes recognize the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (as for Appendix C of MRA see <http://kcdb.bipm.org/AppendixC/default.asp>).

**Expiration of Certification**

This certificate is valid for six months from the date of shipment or until August 23, 2022, whichever comes earlier, provided that the material remains unopened and is stored in accordance with the instructions given in this certificate.

**Sample Form**

This CRM is in the form of a colorless solution. This CRM of ca. 250 mL in net volume is kept 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 stored in a clean atmosphere at a temperature between 15 °C and 30 °C.

**Instructions for Use**

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 should be opened after warming to room temperature. Prior to use, the bottle should be shaken gently to avoid the formation of air bubbles. This CRM should be used promptly once the bottle is opened.

**Precautions for Handling**

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

**Preparation**

The prescribed amounts of potassium chloride were dissolved in the prescribed amount of pure water; the nominal molality is 0.1 mol kg<sup>-1</sup>. The solution was in equilibrium with atmospheric carbon dioxide and divided into 250-mL glass bottles; each bottle contains ca. 250 mL of the solution.

**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.

**Information**

If substantive technical changes occur that affect the certification before the expiration of this certificate, NMIJ will notify the registered customer. Customer registration on the NMIJ Website (given below) will facilitate notification. 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.

September 4, 2018

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/>