

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 5121-a04

No. +++

Electrolytic Conductivity Standard Solution  
Aqueous Solution of Potassium Chloride (1 mol kg<sup>-1</sup>)

This certified reference material (CRM) is produced in accordance with the NMIJ's management system and is in compliance with ISO 17034 and ISO/IEC 17025. 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 %.

	Certified value, S m <sup>-1</sup>	Expanded uncertainty, S m <sup>-1</sup>
Electrolytic Conductivity (25 °C)	10.851	0.060

**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 °C ± 0.014 °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 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.

**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 September 25, 2022, whichever comes earlier, provided that the material remains unopened and is stored in accordance with the instructions given in this certificate.

**Sample Form**

The net volume of this CRM is *ca.* 250 mL, in a screw-cap glass bottle.

**Homogeneity**

Several solutions subdivided from the originally prepared solution were determined by analyzing 6 bottles (3 electrolytic

conductivities). 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 place 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 reaching 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 amount of potassium chloride was dissolved in the prescribed amount of pure water; the nominal molality is 1 mol kg<sup>-1</sup>. The solution was in equilibrium with atmospheric carbon dioxide, and divided among several 250-mL of glass bottles.

**NMIJ Analysts**

The technical manager for this CRM is MIURA T., the production manager is ASAKAI T., and the analysts are MAKUSIMOV I., ONUMA S., SUZUKI T. and ASAKAI T.

**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.

April 1, 2020

ISHIMURA Kazuhiko

President

National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact:  
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