

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 3001-c
No. +++

Potassium Hydrogen Phthalate

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 the standardization of titrants and, the calibration of organic carbon concentration for the quantitative analysis among other applications.

Certified Values

The certified values of this CRM are 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, Mass fraction (%)	Expanded uncertainty Mass fraction (%)
Acids expressed as potassium hydrogen phthalate	99.980	0.019
Organic carbon	47.051	0.020

Analysis

The mass fraction of acids expressed as potassium hydrogen phthalate used as the certified value was determined by analyzing 10 bottles selected by stratified random sampling based on the order of bottling. The mass fraction of organic carbon was determined from the phthalate content, which was assessed from the contents of acid, potassium, and the other trace components. The molar mass of potassium hydrogen phthalate (204.2206) was calculated from the IUPAC atomic weight table (2013). The value of the Faraday constant used was $96\,485.332\,89\text{ C mol}^{-1}$ (CODATA: 2014). A potassium hydrogen phthalate density of 1.636 g cm^{-3} (25 °C) was used as for air-buoyancy correction.

Metrological Traceability

The mass fraction of acids expressed as potassium hydrogen phthalate used as the certified value was determined by coulometric titration as the primary method of measurement, and is traceable to the International System of Units (SI). The mass fraction of organic carbon was determined from the phthalate content, which was assessed from the assay results of coulometric titration for acid, gravimetric analysis for potassium, ion chromatography for trace components, and inductively coupled plasma optical emission spectrometry (ICP-OES) for trace metals. Coulometric titration and gravimetric analysis are one of the primary method of measurement. Ion chromatography and ICP-OES are based on monoelemental standard solutions of the NMIJ CRM 3600 series. Therefore the values are traceable to the SI.

Indicative Values

Indicative values of this CRM are given in the table below. The uncertainty of the indicative 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%.

	Indicative value, Mass fraction (%)	Expanded uncertainty Mass fraction (%)
Potassium	19.144	0.014
Sodium	0.0034	0.0002

The mass fraction of potassium was determined by gravimetric analysis as potassium sulfate. The mass fraction of sodium was determined by ion chromatography based on NMIJ CRM 3601-a sodium standard solution. The mass fraction of other heavy metal was assessed as less than 0.006 % by ICP-OES.

Mutual Recognition Arrangement under Meter Convention

The certified value of the mass fraction of acids expressed as potassium hydrogen phthalate in this certificate is consistent with the calibration and measurement capabilities (CMCs) 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 quantities, ranges and measurement uncertainties specified in Appendix C (for Appendix C of MRA, see <http://kcdb.bipm.org/AppendixC/default.asp>).

Expiration of Certification

This certificate is valid for one year from the date of shipment, provided that the material is stored in accordance with the instructions given in this certificate.

Sample Form

This CRM is in the form of a white powder at ordinary temperature and is contained in a brown glass bottle (net mass 50 g).

Homogeneity

The homogeneity of this CRM was determined by coulometric titration analysis of 10 bottles which were selected by stratified random sampling on the order of bottling. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage

This CRM should be stored at a temperature between 15 °C and 35 °C, at a relative humidity of 60 % or less, and shielded from light.

Instructions for Use

This CRM should be dried for 1 h at 120 °C without crushing and then held at room temperature for another 1 h in a silica-gel desiccator. The recommended minimum sample mass for analysis is 0.4 g. The dried material should be used promptly after drying and should not be dried again.

Precautions for Handling

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

Preparation

The source material of this CRM was purchased from Kanto Chemical Co., Inc.

NMIJ Analysts

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

Date of Shipment: ***** xx, 20xx

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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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