

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 6006-a  
No. +++

Urea

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 calibrating the analytical instruments or reagents, controlling the precision of analysis, and confirming the validity of analytical methods and instruments in urea analysis.

**Certified Value**

The certified value for the purity (in mass fraction) 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 %.

	CAS No.	Certified value, Mass fraction (kg/kg)	Expanded uncertainty Mass fraction (kg/kg)
Urea	57-13-6	0.999	0.001

**Analysis**

The certified value is based on the results of acidimetric titration and nitrogen determination by Kjeldahl method.

**Metrological Traceability**

The certified value was determined by titrimetry as a primary method of measurement with NMIJ CRM 3001-a (potassium hydrogen phthalate) and NIST SRM 351 (sodium carbonate) as primary standards. It is traceable to the International System of Units (SI).

**Indicative Value**

The indicative value for the nitrogen (in mass fraction) is given in the table below. The value was determined from nitrogen analysis by Kjeldahl method. This indicative value can be used for confirming the validity of analytical methods or instruments in elementary analysis. 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 (kg/kg)	Expanded uncertainty Mass fraction (kg/kg)
Nitrogen	0.4661	0.0006

**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 one year from the date of shipment, 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 white powder and it of ca. 10 g in net volume is kept in a glass vial.

### Homogeneity

The homogeneity of the CRM was evaluated using sensitivity corrected area percentage of urea by high performance liquid chromatography (HPLC), analyzing 10 vials selected from 300 vials. 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 25 °C in a clean, and dry place and shielded from light.

### Instructions for Use

From the homogeneity, a minimum sample mass of 0.05 g should be used. This CRM is for laboratory use only and not for *in vivo* use.

### Precautions for Handling

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

### Preparation

This CRM was prepared by Takasugi Pharmaceutical Co., Ltd.

### Technical Information

The following values at the time of the certification are not certified but are provided for information. Biuret, triuret, and cyanuric acid determined by high performance liquid chromatography (HPLC) were 0.25 g/kg, 0.04 g/kg and 0.03 g/kg, respectively. Moisture was determined by Karl Fischer titration to be 0.1 g/kg. Soluble ammonium by ion chromatography was 0.08 g/kg.

### NMIJ Analysts

The technical and production managers for this CRM are TAKATSU A. and the analysts are TAKATSU A., EYAMA S. and SAEKI M.

### 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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National Metrology Institute of Japan,  
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Phone: +81-29-861-4059; Fax: +81-29-861-4009, <https://unit.aist.go.jp/nmij/english/refmate/>

Revision history

April 27, 2012: 'Indicative value' and the description on Mutual Recognition Arrangement under Metre Convention were added.

April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."

November 22, 2016: The description in "Expiration of Certification" was changed to "one year from the date of shipment."

Sample