National Institute of Advanced Industrial Science and Technology
National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4030-a
No. +++
Bisphenol A

This certified reference material (CRM) was produced in accordance with the NMIJ's management system, and in compliance with JIS Q 0034 (ISO Guide 34). It is primarily intended for use in the calibration of analytical instruments. In addition, it is intended for use in quality control of analytical instruments, and in validation of analytical techniques and instruments.

Certified Value
The certified value of purity (amount-of-substance 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%.

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Certified value, Amount-of-substance fraction (mol/mol)</th>
<th>Expanded uncertainty, Amount-of-substance fraction (mol/mol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-05-7</td>
<td>0.9992</td>
<td>0.0006</td>
</tr>
</tbody>
</table>

Analysis
The certified value was determined by the freezing point depression method carried out using a differential scanning calorimeter (DSC) operated in accordance with the stepwise scan method. The combined standard uncertainty was estimated as a combination of standard uncertainties in purity determination and homogeneity test.

Metrological Traceability
The certified value was determined by the freezing point depression method carried out using a DSC and was traceable to the International System of Units (SI). The temperature of the DSC was calibrated in accordance with NIST SRM 2225 (mercury) and NIST SRM 1745 (indium). The enthalpy of the DSC was calibrated in accordance with NIST SRM 2225 (mercury).

Indicative Value
Purity (mass fraction) of the CRM was (0.9997 ± 0.0004) kg/kg, which was obtained by converting the purity (amount-of-substance fraction) using the estimated average molecular weight of impurities. The value following the sign “±” is the half-width of an expanded uncertainty interval calculated using a coverage factor \((k)\) of 2, which gives a level of confidence of approximately 95%. The concentration of toluene as determined by gas chromatography was 0.13 g/kg.

Mutual Recognition Arrangement (CIPM MRA)
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 until March 31, 2019, provided that the CRM 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 at room temperature. It is sealed in an amber glass vial containing nitrogen gas. The vial is sealed in an aluminum-layered bag containing nitrogen gas. The net amount is 1.5 g for each vial.
Homogeneity
Eight vials were sampled from 300 subdivided vials at almost equal intervals in the order of subdivision for a homogeneity test based on high-performance liquid chromatography. The area percentage of bisphenol A was measured and evaluated by the homogeneity test. The evaluated variations between the purities (amount-of-substance fraction) of the vials due to inhomogeneity were taken into account for determining the uncertainty in the certified value.

Precautions for Storage
This CRM should be stored in a cold (temperature: about –20 °C) and a dark place.

Instructions for Use
This CRM is for laboratory use only. The vial of this CRM should be allowed to warm to room temperature before opening. This CRM should be used promptly once a vial is opened. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation of CRM
This CRM was purified and subdivided by Wako Pure Chemical Industries, Ltd. It was purified by recrystallization using toluene, vacuum drying, mixing with dichloromethane, filtration, and drying. Bisphenol A of 1.5 g was filled into an amber glass vial in a dry nitrogen atmosphere. The vial was then sealed in an aluminum-layered bag in an argon atmosphere.

NMIJ Analysts
For this CRM, the technical manager is K. Kato, the production manager is Y. Shimizu, and the production analysts are Y. Shimizu, K. Ishikawa, R. Iwasawa, X. Bao, and K. Higuchi. Stability tests were performed by the National Institute of Technology and Evaluation until 2005 as a collaborator.

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.

April 1, 2015
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

Revision history
February 1, 2012: The expiration date of this certificate was changed to March 31, 2019, from March 31, 2013. The format of this certificate was updated. Mutual Recognition Arrangement (CIPM MRA) was added.
April 1, 2015: “Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”