National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 8113-a
No. +++

National Institute of Advanced Industrial Science and Technology
AIST

Heavy Metals (Cd, Cr, Hg, Pb) in ABS Resin - High Concentration Pellet

This certified reference material (CRM) was produced in accordance with the NMIJ's management system, and in compliance with ISO GUIDE 34:2000 and ISO/IEC 17025:2005. This CRM is intended for use in controlling the precision of analysis and validating analytical methods and instruments during the quantitative determination of Cd, Cr, Hg and Pb in ABS resin and similar polymers

Certified Values

The certified values of Cd, Cr, and Pb in this CRM are given in the table below. The drying method is described in this certificate. 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 (mg/kg)	Expanded uncertainty, Mass fraction (mg/kg)
Cd	89.8	6.8
Cr	905	55
Pb	905	51

Analysis

The certified values of this CRM were determined by the following analytical method:
(1) Microwave digestion using sulfuric acid and nitric acid / isotope dilution – inductively coupled plasma mass spectrometry.

Metrological Traceability

The certified values of this CRM were determined by more than one method, including isotope dilution–mass spectrometry as a primary method of measurement with NMIJ primary standard solutions of Cd, Cr, Hg, and Pb. The certified values are traceable to the International System of Units (SI).

Indicative Value

The indicative value of Hg in this CRM is given in the table below, that was determined by the same analytical method as for the certified values. The quoted uncertainties are the half-width of the expanded uncertainty intervals calculated using a coverage factor (k) of 2, which gives a level of confidence of approximately 95 %.

	Indicative value, mass fraction (mg/kg)
Hg	915 ± 129

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 from the date of shipment to March 31, 2016, provided that the material remains unopened and stored in accordance with the instructions given in this certificate.

Sample Form

This CRM consists of small pellets. The net mass is 25 g, kept in a brown glass bottle.

Homogeneity

The homogeneity of this CRM was determined by analyzing 9 bottles (7 bottles for Hg) randomly selected taking into consideration the order of bottling. The elements (Cd, Cr, Hg and Pb) were determined by microwave digestion using sulfuric acid and nitric acid / isotope dilution – inductively coupled plasma mass spectrometry. The homogeneity of each element is reflected in the uncertainty of the certified value.

Instructions for Storage

This CRM should be kept at 15 °C to 35 °C and shielded from light.

Instructions for Use

Prior to use, the sample should be mixed by slow rolling. It should be dried for 1 h at 80 °C and then maintained at room temperature for 1 h in a silica-gel desiccator. The recommended sample mass is 0.10 g or more for one analysis. Please note that this sample contains tens mg/kg of Br.

Precautions for Handling

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

Preparation Method

This CRM was produced by carrying out a new homogeneity test and new assignment of property values for the remaining bottles of NMIJ CRM 8113-a that was disseminated until March 2011. The NMIJ CRM 8113-a was originally prepared as follows:

Commercial ABS resin and powders of CdO, $PbCrO_4$, chromium(III) acetylacetonate and HgS were mixed and then pellets were produced from the mixture. The pellet-producing process was repeated two more times.

NMIJ Analysts

The technical and production manager for this CRM is A. Hioki, and the analyst is M. Ohata.

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
Phone: +81-29-861-4059; Fax: +81-29-861-4009; https://www.nmij.jp/english/service/C/

Revision history
August 10, 2012: The expiration of certification was extended from March 31, 2013 to March 31, 2016.
April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."