National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 8105-a
No. +++

Heavy Metals (Cd, Cr, Pb) in ABS Resin - Low Concentration Disk

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 controlling the precision of analysis or confirming the validity of analytical methods or instruments during the quantitative analysis of Cd, Cr and Pb in ABS resin or similar polymers.

Certified Values

The certified values of Cd, Cr and Pb in this CRM are given in the table below. This CRM should be used without any drying. 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	10.70	0.38
Cr	27.5	0.50
Pb	108.28	1.24

Analysis

Each certified value of this CRM was determined by the microwave digestion using sulfuric acid and nitric acid / isotope dilution – inductively coupled plasma mass spectrometry.

Metrological Traceability

Each certified value of this CRM is determined by the isotope dilution-mass spectrometry, which is the primary method, of measurement with the NMIJ primary standard solutions of Cd, Cr and Pb. The certified values of this CRM, therefore, are traceable to the International System of Units (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

The certification of this CRM is valid until March 31, 2023, 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 disk with a diameter of 30 mm and a thickness of 2 mm. This CRM is kept in a plastic container.

Homogeneity

The homogeneity of this CRM was determined by analyzing 28 pieces (0.10 g each) which were cut from the vicinities of the disks in the plates produced by the hot-press method. Cd, Cr, and Pb were determined by the microwave digestion using sulfuric acid and nitric acid / isotope dilution-inductively coupled plasma mass spectrometry. The homogeneity of each element has been incorporated into the uncertainty of each certified value. This CRM is homogeneous within the range of the uncertainties of the certified values.

Instructions for Storage

This CRM should be stored at a temperature between 15 °C and 35 °C in a clean place and shielded from light.

Instructions for Use

In terms of the homogeneity, the certified values of this CRM represent the concentrations of a sample with a surface area of more than 50 mm^2 (an area corresponding to a circle with a diameter of 8.0 mm). This CRM contains metallic elements in addition to the certified elements (Cd, Cr and Pb).

Precautions for Handling

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

Preparation

Commercially-available freeze-dried ABS resin and CdO and $PbCrO_4$, both of which are in the form of powder, were mixed, and from this mixture, pellets were produced. The agitating/mixing/pelletizing process was repeated two more times. These master pellets and commercially-available freeze-dried ABS resin were mixed, and then the agitating/mixing/pelletizing process was repeated three times. The produced pellets were shaped into plates with a thickness of 2 mm by the hot-press method. From these plates, disks with a diameter of 30 mm were cut.

NMIJ Analysts

The technical and production managers are HIOKI A. and the analyst is OHATA 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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Phone: +81-29-861-4059; Fax: +81-29-861-4009, https://unit.aist.go.jp/nmij/english/refmate/

Revision history	
March 24, 2009:	The expiration of certification was extended from “March 31, 2011” to “March 31, 2016.”
	The description on “Mutual Recognition Arrangement under Meter Convention” was added.
January 20, 2014:	The expiration of certification was extended from “March 31, 2016” to “March 31, 2023.”
April 1, 2015:	“Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”