

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 8108-b

No. +++



Polybrominated Diphenyl Ethers in Polystyrene

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 analysis of decabromodiphenyl ether (DBDE) in polystyrene resin.

Certified Value

The certified value of this CRM, mass fraction of DBDE, is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

	CAS No.	Certified value, Mass fraction (mg/kg)	Expanded uncertainty, Mass fraction (mg/kg)
Decabromodiphenyl ether	1163-19-5	312	17

Analysis

The certified value of this CRM is the weighted mean of the results determined by the following analytical methods:

- 1) Gas chromatography / mass spectrometry (isotope dilution method)
- 2) High-performance liquid chromatography (standard addition method)

Metrological Traceability

The certified value of this CRM was determined by two analytical methods described in the "Analysis" based on the purity of DBDE, which was characterized by mass balance method at NMIJ.

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.

Description of the material

This CRM is in the form of a colorless and transparent polystyrene disk at room temperature. The diameter, thickness and mass of the disk are about 30 mm, 2 mm and 1.4 g, respectively. Five disks are packed in an aluminum-laminated plastic bag.

Homogeneity

The homogeneity of this CRM was evaluated by intensities of X-ray fluorescence from bromine in the diameter range of about 3 mm at the center of disks selected. Eleven disks were selected almost equal intervals in the order of production from 3000 disks produced for the evaluation. X-ray fluorescence intensities from five places in one disk were also evaluated. It was assumed that the X-ray fluorescence intensity was proportional to the mass fraction of bromine. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage

This CRM should be kept in the aluminum-laminated plastic bag and should be stored at a temperature between 5 °C and 35 °C in a clean and dark place.

Instructions for Use

This CRM is for laboratory use only. This CRM should not be touched with bare hands. This CRM should be used one or more disks in disk form. The certified and the information values may change when light such as X-ray is irradiated to this CRM because it can degrade.

Precautions for Handling

Pay attention to fire and ventilation; wear protective mask, protective gloves, etc. DBDE is designated as Class 1 Designated Chemical Substances in the Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. It is also designated as Class I Designated Chemical Substances in the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR law). Handle in compliance with these laws. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

This CRM was prepared by Chemical Evaluation and Research Institute, Japan (CERI). Polystyrene resin and DBDE were mixed and extruded, then disks were made by injection molding.

Technical Information

The estimated mass fraction of Br associated to the flame retardants in this CRM was 264 mg/kg in 2009. It was estimated from the certified value of this CRM and the composition of the flame retardant added to this CRM determined by HPLC.

NMIJ Analysts

The technical managers for this CRM are KINUGASA S. and SAITO T., the production manager is MATSUYAMA S., and the analysts are ORIHARA Y., KINUGASA S., and MATSUYAMA S.

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.

Note

The purity of the primary standard was validated in an international comparison in Asian collaboration on reference materials (ACRM).

This work was supported by a grant from New Energy and Industrial Technology Development Organization (NEDO).

April 1, 2020

ISHIMURA Kazuhiko
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://unit.aist.go.jp/nmij/english/refmate/>

Revision history

- October 01, 2010: Descriptions on type II monitoring chemical substance according to 'the act on the evaluation of chemical substances and regulation of their manufacture', and class 1 specific substance according to 'Law concerning Pollutant Release and Transfer Register' in the '**Precautions for Handling**' were added.
- March 19, 2014: Expiration of this certificate was extended to "Dec. 31, 2014" from "March 31, 2019".
- April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."
- January 12, 2018: The description in "Expiration of Certification" was changed to "one year after the date of shipment."

Instruction on attachment

Polystyrene

This polystyrene attached to NMIJ CRM 8108-b was made from polystyrene resin used for the matrix of NMIJ CRM 8108-b. This polystyrene resin was made by injection molding with same production condition of NMIJ CRM 8108-b. This polystyrene was not mixed with decabromodiphenyl ether (DBDE).
Storage condition is same as the NMIJ CRM 8108-b.

Appendix

This polystyrene was a result of the project aided from the New Energy and Industrial Technology Development Organization (NEDO) in 2005.

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,
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