

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 8137-a
No. +++

PP Resin Pellet for Bromine Analysis

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 analyses and validating analytical methods used for chemical analysis of Br in PP resin or similar polymers.

Certified Value

The certified value for Br in this CRM 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 %.

	Certified value, Mass fraction (mg/kg)	Expanded uncertainty, Mass fraction (mg/kg)
Br	303	15

Analysis

The certified value of this CRM was an equally weighted mean of the results obtained by using the following analytical methods:

- (1) Microwave digestion using nitric acid / isotope dilution- inductively coupled plasma mass spectrometry, and
- (2) Neutron activation analysis with internal standardization

Metrological Traceability

The certified value is determined by the analytical methods, including ID-ICP-MS which is the primary method of measurement, with the NMIJ primary standard solution of KBr. The certified value, therefore, is 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

This certificate is valid from the date of shipment to March 31, 2023, provided that this CRM is stored in accordance with the instructions given in this certificate.

Description of the material

This CRM is in the form of pellets with a weight of about 10 mg, a diameter of 1 mm to 2 mm and a length of 2 mm to 3 mm. The pellets of ca. 25 g in net mass are kept in a brown glass bottle.

Homogeneity

The homogeneity of the CRM was determined by analyzing 33 pellets (three pellets from each of the 11 bottles). The elements (Br and C) were measured by laser ablation/inductively coupled plasma mass spectrometry and the ratios of Br/C were used for the evaluation of homogeneity of Br. The homogeneity is has been incorporated into the uncertainty of the certified value.

Instructions for Storage

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

Instructions for Use

In terms of the homogeneity, the certified value of this CRM represents Br concentration in a pellet. At least one pellet, therefore, should be used for each analysis. This CRM contains metallic elements (Cd, Cr, Hg, and Pb) in addition to the certified element.

Precautions for Handling

Do not use this standard substance for testing/research purposes only. Pay attention to fire and ventilation; wear protective mask, protective gloves, etc. DBDE (deca brominated biphenyl ether) 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

In a plastic bag, commercially-available PP resin pellets were mixed with DBDE, CdO, chromium (III) acetylacetonate, HgS and PbCrO₄, all of which were reagents in the form of powder, through the dry blending process. The mixture was extruded by an extruder at 200°C, and the extruded mixture was pelletized by a pelletizer, and homogenized. The agitating/mixing/pelletizing process was carried out three times to achieve sufficient homogeneity of elements in the PP resin pellet CRMs.

NMIJ Analysts

The technical manager for this CRM is MIURA T., the production manager is OHATA M., and the analysts are OHATA M., MIURA T, WADAA., HIOKI A., KIDOKORO T., and ISHIKAWA Y.

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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Revision history

April 1, 2015: “Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”
February 21, 2017: The description on “Mutual Recognition Arrangement under Meter Convention” was added.
The description in “Expiration of Certification” was changed to “one year from the date of shipment.”
June 14, 2022: The description in “Expiration of Certification” was changed to “March 31, 2023 from the date of shipment.”

Sample