Date of Shipment: Xxxxx xx, 20xx 8152b02-250314-250314

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 8152-b(02)

No. +++

Polyvinyl Chloride (Phthalate Esters in PVC Resin Pellet)

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 and for validating analytical methods and instruments during quantification of phthalates in polyvinyl chloride resin and similar materials.

Certified Values

The certified values, mass fractions of phthalates, are 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 %.

Substance	CAS No.	Certified value, Mass fraction (mg/kg)	Expanded uncertainty, Mass fraction (mg/kg)
Diethyl phthalate	84-66-2	879	56
Dibutyl phthalate (Di-*n*-butyl phthalate)	84-74-2	879	70
Diisobutyl phthalate	84-69-5	891	53
Benzyl butyl phthalate	85-68-7	871	53
Dicyclohexyl phthalate	84-61-7	861	58
Bis(2-ethylhexyl) phthalate (Di-2-ethylhexyl phthalate)	117-81-7	876	76

Analysis

The certified values of this CRM were based on the analytical results of phthalates by isotope dilution-gas chromatography/ mass spectrometry (ID-GC/MS).

Metrological Traceability

The certified values of this CRM were determined by isotope dilution-mass spectrometry which was one of the primary methods of measurement. Diethyl phthalate (NMIJ CRM 4022-b), di-*n*-butyl phthalate (NMIJ CRM 4023-a), benzyl butyl phthalate (NMIJ CRM 4029-a), dicyclohexyl phthalate (NMIJ CRM 4028-a), di-2-ethylhexyl phthalate (NMIJ CRM 4024-a), and

diisobutyl phthalate whose purity was evaluated with quantitative NMR at NMIJ were used as the primary standards of the calibration solution for quantification prepared by gravimetric preparation. The certified values, therefore, are traceable to the International System of Units (SI).

Expiration of Certification

This certificate is valid for one year from the date of shipment, provided that this remains unopened and CRM is stored in accordance with the instructions given in this certificate.

Description of the Material

This CRM is in the form of a grayish white pellets of polyvinyl chloride and a 20 g in net mass is kept in an amber glass bottle. The amber glass bottle is sealed with argon gas in an aluminum-layered bag.

Instructions for Storage

This CRM should be stored in a clean place at a temperature of 15 °C to 35 °C and protected from light. Do not contact by placing this CRM horizontally to other plastics such as a bottle cap for long period.

Instructions for Use

This CRM is for laboratory use only. This CRM should be used promptly once a bottle is opened. Considering the homogeneity, a minimum sample mass of 0.1 g should be used to ensure valid results.

Precautions for Handling

Keep away from heat and ignition sources. Wear personal protective equipment, such as a safety mask and gloves when handling. The use, handling and storage of this CRM should be performed while observing the laws regulating the components of this CRM. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

This CRM was prepared by excluding from the mixture of polyvinyl chloride resin, stabilizer, lubricant, plasticizer (acetyl tributyl citrate; CAS No. 77-90-7, eight phthalates and di-2-ethylhexyl adipate) and other polymer additives. The excluding process was conducted by Chemicals Evaluation and Research Institute, Japan.

Technical Information

This CRM contains dimethyl phthalates, dioctyl phthalate and bis(2-ethylhexyl) adipate. The mass fractions of them on February 26, 2020 were given in the table below. These values were determined by the method described in “Analysis”, using commercially available reagents as calibration standards.

Substance	CAS No.	Informational value, Mass fraction (mg/kg)
Dimethyl phthalate	131-11-3	886
Dioctyl phthalate (Di-*n*-octyl phthalate)	117-84-0	904
Bis(2-ethylhexyl) adipate (Di-2-ethylhexyl adipate)	103-23-1	892

NMIJ Analysts

The technical manager and the production managers for this CRM are HANARI N., and the analysts are HANARI N., MATSUYAMA S., ORIHARA Y., AOYAGI Y., NAKAMURA K., YAMAZAKI E., YAMAZAKI T., KITAMAKI Y. and

Date of Shipment: Xxxxx xx, 20xx 8152b02-250314-250314

ITOH N.

Information

If substantive technical changes occur that affect the certification before the expiration of this certificate, NMIJ will notify the registered customers. 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.

March 14, 2025

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, https://unit.aist.go.jp/nmij/english/refmate/