

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 4074-a  
No. +++

Trichloroacetic Acid

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 the calibration of analytical instruments quality control of analytical instruments, and validation of analytical techniques and instruments.

**Certified Value**

The certified value of this CRM 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 %.

Substance	CAS No.	Certified value, Mass fraction (kg/kg)	Expanded uncertainty, Mass fraction (kg/kg)
Trichloroacetic Acid	76-03-9	0.999	0.003

**Analysis**

The certified value of this CRM was a mean value of mass fraction of trichloroacetic acid obtained by the freezing point depression method based on the stepwise scan method using a differential scanning calorimeter (DSC) and that obtained by the neutralization titrimetry. The combined standard uncertainty of the certified value was estimated by combining standard uncertainties derived from purity determination, deviation between the methods, homogeneity test, and stability test.

**Metrological Traceability**

The certified value of this CRM was determined by the primary methods of measurement, namely the freezing point depression method and the titrimetry. The purity (mass fraction) by the freezing point depression method was obtained using the DSC of which scales of temperature and enthalpy were calibrated with NMIJ CRM 5401-a (cyclohexane) and NIST SRM 2232 (indium). The purity (mass fraction) by the titrimetry was obtained using sodium hydroxide aqueous solution as a titrant calibrated with NMIJ CRM 3004-a (amidosulfuric acid). Balances calibrated through the Japan Calibration Service System (JCSS) were used in weighing for the determination. The certified value, therefore, is traceable to the International System of Units (SI).

**Mutual Recognition Arrangement under Metre Convention**

The certified value of this CRM is recognized for international equivalence based on the Mutual Recognition Arrangement under the Metre Convention (CIPM MRA). The calibration measurement capability (CMC) of NMIJ related to this CRM is registered in the Key Comparison Database (KCDB) (see <https://www.bipm.org/kcdb/>) of the International Bureau of Weights and Measures (BIPM).

**Expiration of Certification**

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

**Description of the Material**

This CRM is in the form of a white solid at ordinary temperature, and ca. 1.5 g of trichloroacetic acid is kept in an amber glass

vial with argon gas and the vial is sealed in an aluminum laminated bag with argon gas.

#### **Instructions for Storage**

This CRM should be stored at a temperature between  $-25\text{ }^{\circ}\text{C}$  and  $-15\text{ }^{\circ}\text{C}$  in a clean place and shielded from light.

#### **Instructions for Use**

This CRM is for laboratory use only. The vials of this CRM should be allowed to warm to room temperature and shaken well before opening. This CRM should be used as soon as possible once a vial is opened. This CRM, after being warmed to room temperature, should be opened in as a low humidity condition as possible since it is deliquescent. More than 0.2 g of the material should be used in each analysis.

#### **Precautions for Handling**

Keep away from heat and ignition sources. Wear personal protective equipment such as safety glasses, safety mask and safety gloves when handling. Refer to the safety data sheet (SDS) on this CRM before use.

#### **Preparation**

This CRM was prepared by KANTO CHEMICAL CO., INC. For packaging, each amber glass vial was filled with 1.5 g of trichloroacetic acid. The vial was then sealed in an aluminum laminated bag with argon gas.

#### **Technical Information**

This CRM contains dichloroacetic acid as an impurity. The mass fraction of dichloroacetic acid determined by the high performance liquid chromatography was 0.44 g/kg at the time of certification.

#### **NMIJ Analysts**

The technical manager for this CRM is NUMATA M. The production manager is SHIMIZU Y. and analysts are SHIMIZU Y., YAMAZAKI T., SAITO N., KITAMAKI Y., BAO X., and NAKAMURA 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.

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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National Metrology Institute of Japan,  
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Phone: +81-29-861-4059; <https://unit.aist.go.jp/nmij/english/refimate/>

Revision history

December 18, 2019: Expanded uncertainty in “Certified Value” was changed

The description in “Instructions for Storage” was changed.

January 25, 2024 “Mutual Recognition Arrangement under Metre convention” was added.

Sample