

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 4054-a

No. +++

Acetaldehyde



This certified reference material (CRM) was produced in accordance with the NMIJ's management system and in compliance with ISO GUIDE 34:2009 and ISO/IEC 17025:2005. This CRM is intended for use in the calibration of instruments and for confirming the validity of analytical methods and instruments.

**Certified Value**

The certified value of this CRM is the purity with the mass fraction 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 %.

	CAS No.	Certified value, Mass fraction (kg/kg)	Expanded uncertainty, Mass fraction (kg/kg)
Acetaldehyde (Ethanal)	75-07-0	0.998	0.005

**Analysis**

The certified value of this CRM is calculated on the basis of the results of acidimetric titration and impurity determination. Impurities in acetaldehyde were quantified by gas chromatography with flame ionization detection (GC-FID) and residue weighing after evaporation. The atomic weight of the CRM was referred to from the "Atomic Weights of the Elements 2007" published by IUPAC.

**Metrological Traceability**

The certified value was determined by titrimetry as a primary method of measurement carried out in accordance with NMIJ CRM 3001-a (potassium hydrogen phthalate) as a primary standard. Further, this value 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 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.

**Sample Form**

The CRM is sealed in a brown glass ampoule. This CRM is in the form of a colorless liquid at room temperature.

**Homogeneity**

The homogeneity of this CRM was determined as the average of the homogeneity of twelve ampoules measured using acidimetric titration methods and GC-FID. The homogeneity of each element is reflected in the uncertainty of the certified value.

**Instructions for Storage**

This CRM should be stored at  $-20\text{ }^{\circ}\text{C}$  and shielded from light.

**Instructions for Use**

This CRM is for laboratory use only. After opening, exposure to air (oxygen) should be avoided. Further, the CRM should be opened in a cool environment (below  $5\text{ }^{\circ}\text{C}$ ).

**Precautions for Handling**

Wear a mask, gloves, and other protective equipment during handling. Refer to the safety data sheet (SDS) on this CRM before use. This CRM is prone to boil at the time of opening, because the boiling point is approximately  $20\text{ }^{\circ}\text{C}$ .

**Preparation Method**

The raw material for preparing this CRM was commercially available high-purity acetaldehyde. Small quantities of the CRM (10 mL) were sealed in brown ampoules by Sigma-Aldrich, Inc.

**Information**

This CRM contains acetic acid as an impurity. The mass fraction of acetic acid determined by GC-FID was  $(1.63 \pm 0.40)\text{ g/kg}$  at the time of certification. The expanded uncertainty was determined using a coverage factor ( $k$ ) of 2, corresponding to an estimated confidence interval of approximately 95%.

**NMIJ Analysts**

For this CRM, the technical manager is K. Kato, the production manager is T. Yamazaki, and the analysts are T. Yamazaki, T. Watanabe, and S. Nakamura.

**Technical Information**

Customer registration on the NMIJ Website (given below) will facilitate notification of any revision of the information given above. 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, 2015

Ryoji Chubachi  
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://www.nmij.jp/english/service/C/>

Revision history

- May 25, 2011: The period of validity was extended to March 31, 2013.
- February 1, 2012: The period of validity was extended to March 31, 2015.
- October 29, 2013: The period of validity was extended to March 31, 2017.  
The section on Mutual Recognition Arrangement (CIPM MRA) was added.
- April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."
- January 11, 2017: The description in "Expiration of Certification" was changed to "one year from the date of shipment"  
The Indicative value was changed to Information.

Sample