National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4051-b0X

Methane

National Institute of Advanced Industrial Science and Technology
AIST

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

Certified Value

The certified value for this CRM is given in the following table. The quoted uncertainty 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, Amount-of-substance fraction (mol/mol)	Expanded uncertainty, Amount-of-substance fraction (mol/mol)	Cylinder No.
Methane	74-82-8	0.999999	0.000018	3BIS-60074

Determination of Certified Value

The certified value for this CRM was determined by the subtracting method that complies with the requirements described in ISO 6142:2001. Impurities in this CRM were determined using the analytical methods listed below. The expanded uncertainty of this CRM was evaluated from the uncertainties in the subtracting method, long-term stability, and dependence of purity on inner pressure.

Impurities	Analytical methods
Nitrogen	Gas chromatography with photoionization detection (GC-PID)
Oxygen	Gas chromatography with photoionization detection (GC-PID)
Argon	Gas chromatography with photoionization detection (GC-PID)
Hydrogen	Gas chromatography with photoionization detection (GC-PID)
Carbon monoxide	Gas chromatography with photoionization detection (GC-PID)
Carbon dioxide	Gas chromatography with photoionization detection (GC-PID)
Ethane	Gas chromatography with flame-ionization detection (GC-FID)
Water	Capacitive hygrometry

Metrological Traceability

GC-PID and GC-FID instruments were calibrated using NMIJ's primary reference gases prepared by the gravimetric blending method. The capacitive hygrometer was calibrated using a reference dew-point meter that was traceable to the primary standard at the National Institute of Standard Technology (Gaithersburg, USA). The concentrations of the impurities were traceable to the International System of Units (SI), and therefore, the certified value was traceable to SI.

Expiration of Certification

The certification of this CRM is valid until March 31, 2017, provided that the material is handled and stored in accordance with the instructions given in this certificate.

Sample

Sample Form

This CRM is supplied in a manganese steel cylinder with an inner volume of 10 L. The specification of the outlet of the cylinder is W22-14 threads left male. The pressure of methane in the cylinder is 8.5 MPa.

Precautions for Storage

This CRM should be stored in compliance with the high pressure gas safety act. This CRM should not be exposed to direct sunlight, and should be kept at a temperature below 40 °C. This CRM should be stored at a place with good ventilation. Further, the CRM should be fastened with a chain to prevent it from falling down. Since methane is a flammable material, open flames or other sources of ignition should not be permitted near the CRM. Further, care should be taken to prevent any leaks from the CRM storage cylinder. Finally, this CRM should be handled according to the safety data sheet (SDS).

Instructions for Use

Open flames should not be permitted near the CRM. The CRM should be used at a place with good ventilation. It is recommended that sufficient substitution of any residual gas be carried out in the regulator, valves, piping, measuring instruments, and so on before using the CRM. To avoid contamination, it is recommended that the joints of piping be checked for leakage. It is desirable that this CRM be used at room temperature (19 °C to 28 °C) because the certified value is based on the analysis carried out at about 24 °C. When the pressure of this CRM is less than 1.5 MPa, its usage should be stopped. This CRM should be returned to the Metrology Management Center of AIST after use or after the expiry date.

Preparation Method

This CRM is a commercially available high-purity methane gas that was supplied and filled by Tokyo Gas Chemicals Co., Ltd.

NMIJ Analysts

For this CRM, the technical manager is K. Kato, the person responsible for production is T. Watanabe, and the production analysts are T. Watanabe and K. Kato.

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.

Sample

May 25, 2009

Tamotsu Nomaguchi
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,
Metrology Management Center, Reference Materials Office,
1-1-1 Umezono, Tsukuba, Ibaraki 305-8563, Japan
Phone: +81-29-861-4059; Fax: +81-29-861-4009; http://www.nmij.jp/english/service/C/

Revision history
March 19, 2014 The expanded uncertainty of this certificate was changed to "0.000018 mol/mol" from "0.000001 mol/mol."

Note: This certificate is a translation of the original Japanese certificate and is not an official document.

Sample