Date of Shipment: Xxxxx xx, 20xx

4051d01-211223-211223

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4051-d01

Methane

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.

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 %.

	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	0.000019	3BIS-60076

Analysis

The certified value was determined by the subtracting method which was complied with requirement described in the ISO 6142-1:2015. Impurities in this CRM were determined by a gas chromatograph with a photoionization detector (GC-PID), gas chromatograph with a flame ionization detector (GC-FID), and a dew-point hygrometer.

Impurities	Analytical Instruments
Nitrogen	Gas chromatograph with photoionization detector (GC-PID)
Oxygen	Gas chromatograph with photoionization detector (GC-PID)
Argon	Gas chromatograph with photoionization detector (GC-PID)
Hydrogen	Gas chromatograph with photoionization detector (GC-PID)
Carbon monoxide	Gas chromatograph with photoionization detector (GC-PID)
Carbon dioxide	Gas chromatograph with photoionization detector (GC-PID)
Ethane	Gas chromatograph with flame ionization detector (GC-FID)
Water	Dew-point hygrometer

Metrological Traceability

The gas chromatographs were calibrated using NMIJ's primary reference gases prepared by the gravimetric method. The dew-point hygrometer was calibrated using a reference dew-point meter which is traceable to the International System of Units (SI). Therefore the certified value is traceable to the 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 this CRM is stored in accordance with the instructions given in this certificate.

Description of the material

This CRM is colorless, odorless, and flammable gas, and it is supplied in a manganese steel cylinder with an inner volume of 10 L. Specification of the outlet of the cylinder is W22-14threads left male. Pressure of methane in the cylinder is above 8.5 MPa at the time of shipment.

Instructions for Storage

This CRM should be stored in compliance with regulations of high-pressure gas and so on. The CRM should not be exposed to direct sunlight. The CRM should be kept temperature below 40 °C and stored at a place with good ventilation. The CRM should be fastened with chain to avoid it from falling down. Since ethane is flammable, open flames and other source of ignition should not be permitted near the CRM. The CRM should be taken care to leaks.

Instructions for Use

It is recommended that this CRM sufficiently displace residual gas in valves, piping systems, measuring instruments and other relevant apparatus before use. To avoid contamination of the environment, it is recommended to check pipe joints for leaks. Since the certified value is based on the analysis in the temperature range of 19 °C to 28 °C, it is recommended that this CRM be used at the temperature range. When pressure of this CRM is less than 1.5 MPa, the usage of the CRM should be stopped.

Precautions for Handling

Wear a protective equipment during handling. Open flames should not be permitted near this CRM. The CRM should be used at a place with good ventilation. Refer to the safety data sheet (SDS) on the CRM before use.

Preparation

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

NMIJ Analysts

The technical manager for this CRM is SHIMOSAKA T., the production manager is WATANABE T., and the analyst is WATANABE T.

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.

December 23, 2021

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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