National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate
NMIJ CRM 4064-a00

Ethane

This certified reference material (CRM) was produced in accordance with the NMJ’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. In addition, it is intended as raw material for preparation of standard gases.

Certified Value
The certified value of this CRM is 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 %.

<table>
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<th>CAS No.</th>
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<th>Expanded uncertainty, Amount-of-substance fraction (mol/mol)</th>
<th>Cylinder Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>74-84-0</td>
<td>0.9999</td>
<td>0.0001</td>
<td>FVN21566</td>
</tr>
</tbody>
</table>

Analysis
The certified value was determined by the subtracting method which complied with the requirement stipulated in the ISO 6142-1:2015. Impurities in this CRM were determined by the gas chromatograph with a thermal conductivity detector (GC-TCD), the gas chromatograph with a flame ionization detector (GC-FID), and a capacitance type hygrometer.

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<tr>
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<td>Capacitance type hygrometer</td>
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Metrological Traceability
The gas chromatographs are calibrated by using the NMJ’s primary reference gases prepared by the gravimetric blending method. The capacitance type hygrometer is calibrated using the reference dew point meter which is traceable to the primary standard at National Institute of Standard Technology (Gaithersburg, USA). Concentrations of the impurities are traceable to the International System of Units (SI), and therefore the purity is traceable to the SI.

Expiration of Certification
This certificate is valid for one year from the date of shipment, provided that the material is stored in accordance with the instructions given in this certificate.
Date of Shipment: xxxxx xx, 20xx

**Sample Form**

This CRM is supplied in a manganese steel cylinder with an inner volume of approximately 3 L. Specification of the outlet of the cylinder is W22-14 threads left male. The amount of ethane in the cylinder was approximately 0.5 kg when this CRM was certified. This CRM is in the form of colorless gas at room temperature.

**Instructions for Storage**

This CRM should be stored in compliance with regulations of high pressure gas and so on. The CRM should be protected from direct sunlight. The CRM should be kept at a temperature below 40 °C and stored in a well-ventilated place. The CRM should be fixed with chain to avoid overturning. Keep away from open flames and other sources of ignition since this CRM is flammable. Care must be taken to avoid leakage.

**Instructions for Use**

Displace residual gas in a regulator, valves, piping systems, measuring instruments, and so on thoroughly with this CRM before use. Check leakage from the joints of the piping system to avoid contamination. Do not take out this CRM in the liquid phase. The certified value is not valid if the CRM is used in the liquid phase. To avoid change in purity, the CRM should not be used after the residual amount drops below 0.2 kg. This CRM should be used within the temperature range of 19 °C to 28 °C.

**Precautions for Handling**

Use personal protective equipment when handling this CRM. Keep away from open flames. The CRM should be used in a well-ventilated place. Refer to the safety data sheet (SDS) on this CRM before use.

**Preparation**

This CRM is a commercially available high-purity ethane gas whose certified value has been determined by NMIJ.

**NMIJ Analysts**

The technical manager for this CRM is T. Shimosaka, the production manager is T. Watanabe, and the analysts are T. Watanabe, N. Matsumoto, and K. Takada.

**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.

March 8, 2017

Ryoji Chubachi
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; Fax: +81-29-861-4009, https://www.nmij.jp/english/service/C/
National Institute of Advanced Industrial Science and Technology  
National Metrology Institute of Japan  
Reference Material Certificate  
NMIJ CRM 4064-a01

Ethane

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. In addition, it is intended as raw material for preparation of standard gases.

Certified Value

The certified value of this CRM is 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%.

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<tr>
<th>CAS No.</th>
<th>Certified value, Amount-of-substance fraction (mol/mol)</th>
<th>Expanded uncertainty, Amount-of-substance fraction (mol/mol)</th>
<th>Cylinder Number</th>
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<tr>
<td>74-84-0</td>
<td>0.9999</td>
<td>0.0001</td>
<td>FVN55969</td>
</tr>
</tbody>
</table>

Analysis

The certified value was determined by the subtracting method which complied with the requirement stipulated in the ISO 6142-1:2015. Impurities in this CRM were determined by the gas chromatograph with a thermal conductivity detector (GC-TCD), the gas chromatograph with a flame ionization detector (GC-FID), and a capacitance type hygrometer.

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Metrological Traceability

The gas chromatographs are calibrat by using the NMIJ’s primary reference gases prepared by the gravimetric blending method. The capacitance type hygrometer is calibrated using the reference dew point meter which is traceable to the primary standard at National Institute of Standard Technology (Gaithersburg, USA). Concentrations of the impurities are traceable to the International System of Units (SI), and therefore the purity is traceable to the SI.

Expiration of Certification

This certificate is valid for one year from the date of shipment, provided that the material is stored in accordance with the instructions given in this certificate.
Sample Form
This CRM is supplied in a manganese steel cylinder with an inner volume of approximately 3 L. Specification of the outlet of the cylinder is W22-14 threads left male. The amount of ethane in the cylinder was approximately 0.5 kg when this CRM was certified. This CRM is in the form of colorless gas at room temperature.

Instructions for Storage
This CRM should be stored in compliance with regulations of high pressure gas and so on. The CRM should be protected from direct sunlight. The CRM should be kept at a temperature below 40 °C and stored in a well-ventilated place. The CRM should be fixed with chain to avoid overturning. Keep away from open flames and other sources of ignition since this CRM is flammable. Care must be taken to avoid leakage.

Instructions for Use
Displace residual gas in a regulator, valves, piping systems, measuring instruments, and so on thoroughly with this CRM before use. Check leakage from the joints of the piping system to avoid contamination. Do not take out this CRM in the liquid phase. The certified value is not valid if the CRM is used in the liquid phase. To avoid change in purity, the CRM should not be used after the residual amount drops below 0.2 kg. This CRM should be used within the temperature range of 19 °C to 28 °C.

Precautions for Handling
Use personal protective equipment when handling this CRM. Keep away from open flames. The CRM should be used in a well-ventilated place. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation
This CRM is a commercially available high-purity ethane gas whose certified value has been determined by NMIJ.

NMIJ Analysts
The technical manager for this CRM is T. Shimosaka, the production manager is T. Watanabe, and the analysts are T. Watanabe, N. Matsumoto, and K. Takada.

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National Institute of Advanced Industrial Science and Technology
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Reference Material Certificate
NMIJ CRM 4064-a02
Ethane

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. In addition, it is intended as raw material for preparation of standard gases.

Certified Value
The certified value of this CRM is 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%.

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Analysis
The certified value was determined by the subtracting method which complied with the requirement stipulated in the ISO 6142-1:2015. Impurities in this CRM were determined by the gas chromatograph with a thermal conductivity detector (GC-TCD), the gas chromatograph with a flame ionization detector (GC-FID), and a capacitance type hygrometer.

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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 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 or other source of ignition should not be permitted near the CRM. The CRM should be taken care to leaks.

Instructions for Use
Displace residual gas in a regulator, valves, piping systems, measuring instruments, and so on thoroughly with this CRM before use. Check leakage from the joints of the piping system to avoid contamination. Do not take out this CRM in the liquid phase. The certified value is not valid if the CRM is used in the liquid phase. To avoid change in purity, the CRM should not be used after the residual amount drops below 0.2 kg. This CRM should be used within the temperature range of 19 °C to 28 °C.

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