

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 3408-a01

Oxygen in Nitrogen (10 $\mu\text{mol/mol}$)

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. It is intended for use in the calibration of analytical instruments for oxygen determination.

Certified Value

The certified value for oxygen in 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 %.

	CAS No.	Certified value, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Expanded uncertainty, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Cylinder No.
Oxygen	7782-44-7	9.01	0.19	CPB32036

Analysis

The certified value was determined by the gravimetric preparation method for standard gas mixtures, as described in ISO 6142:2001. The uncertainty of the certified value was estimated from uncertainties for the preparation, verification of the amount of substance of oxygen in this CRM, stability, and dependence of the amount of substance of oxygen on the inner pressure.

Metrological Traceability

This CRM was prepared by the gravimetric preparation method, using a mass comparator and weights that are traceable to the International System of Units (SI). The purity of the pure nitrogen and oxygen used for the preparation of this CRM was determined with SI-traceable calibration gases. Therefore the certified values are traceable to the SI.

Expiration of Certification

This certificate is valid until March 31, 2016, from the date of shipment provided that the material is handled and stored in accordance with the instructions given in this certificate.

Sample Form

This CRM is supplied in an aluminum cylinder with an inner volume of 9.5 L. Specification of the outlet of the cylinder is W22-14-threads right male. At the time of supply, the in-cylinder pressure is 5 MP or more at 35 °C.

Instructions for Storage

This CRM should be stored in compliance with any relevant regulations relating to high pressure gas. A cylinder of this CRM should be stored away from direct sunlight and fire at a temperature of 40 °C or less in a well-ventilated place. The CRM should be fixed with chain to avoid overturning. 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. To avoid contamination, we also recommend checking all piping joints for leakage. This CRM should be used only when the internal pressure is 1 MPa or more.

Precautions for Handling

This CRM should be handled in compliance with any relevant regulations relating to high-pressure gas. Use personal protective equipment when handling this CRM. Keep away from open flames. The CRM should be used in a well-ventilated place as this CRM is a simple asphyxiant gas. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

This CRM is prepared by the gravimetric blending method, using pure nitrogen (Japan Fine Products, G1 grade) and oxygen (NMIJ CRM 3404-a).

Technical Information

This CRM contains argon at a molar fraction in the range 0.3 μ mol/mol to 1 μ mol/mol.

NMIJ Analysts

The technical manager for this CRM is T. Shimosaka and the person responsible for production is T. Shimosaka. Analysts for the production are T. Shimosaka 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.

April 1, 2015

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://unit.aist.go.jp/nmij/english/refmate/>

Revision history

April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 3408-a02

Oxygen in Nitrogen (10 $\mu\text{mol/mol}$)

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. It is intended for use in the calibration of analytical instruments for oxygen determination.

Certified Value

The certified value for oxygen in 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 %.

	CAS No.	Certified value, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Expanded uncertainty, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Cylinder No.
Oxygen	7782-44-7	9.55	0.19	CPC00403

Analysis

The certified value was determined by the gravimetric preparation method for standard gas mixtures, as described in ISO 6142:2001. The uncertainty of the certified value was estimated from uncertainties for the preparation, verification of the amount of substance of oxygen in this CRM, stability, and dependence of the amount of substance of oxygen on the inner pressure.

Metrological Traceability

This CRM was prepared by the gravimetric preparation method, using a mass comparator and weights that are traceable to the International System of Units (SI). The purity of the pure nitrogen and oxygen used for the preparation of this CRM was determined with SI-traceable calibration gases. Therefore the certified values are traceable to the SI.

Expiration of Certification

This certificate is valid until March 31, 2016, from the date of shipment provided that the material is handled and stored in accordance with the instructions given in this certificate.

Sample Form

This CRM is supplied in an aluminum cylinder with an inner volume of 9.5 L. Specification of the outlet of the cylinder is W22-14-threads right male. At the time of supply, the in-cylinder pressure is 5 MP or more at 35 °C.

Instructions for Storage

This CRM should be stored in compliance with any relevant regulations relating to high pressure gas. A cylinder of this CRM should be stored away from direct sunlight and fire at a temperature of 40 °C or less in a well-ventilated place. The CRM should be fixed with chain to avoid overturning. 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. To avoid contamination, we also recommend checking all piping joints for leakage. This CRM should be used only when the internal pressure is 1 MPa or more.

Precautions for Handling

This CRM should be handled in compliance with any relevant regulations relating to high-pressure gas. Use personal protective equipment when handling this CRM. Keep away from open flames. The CRM should be used in a well-ventilated place as this CRM is a simple asphyxiant gas. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

This CRM is prepared by the gravimetric blending method, using pure nitrogen (Japan Fine Products, G1 grade) and oxygen (NMIJ CRM 3404-a).

Technical Information

This CRM contains argon at a molar fraction in the range 0.3 μ mol/mol to 1 μ mol/mol.

NMIJ Analysts

The technical manager for this CRM is T. Shimosaka and the person responsible for production is T. Shimosaka. Analysts for the production are T. Shimosaka and K. Takada.

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Ryoji Chubachi
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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://unit.aist.go.jp/nmij/english/refmate/>

Revision history

April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 3408-a03

Oxygen in Nitrogen (10 $\mu\text{mol/mol}$)

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. It is intended for use in the calibration of analytical instruments for oxygen determination.

Certified Value

The certified value for oxygen in 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 %.

	CAS No.	Certified value, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Expanded uncertainty, Amount-of-substance fraction ($\mu\text{mol/mol}$)	Cylinder No.
Oxygen	7782-44-7	9.96	0.19	CPC03007

Analysis

The certified value was determined by the gravimetric preparation method for standard gas mixtures, as described in ISO 6142:2001. The uncertainty of the certified value was estimated from uncertainties for the preparation, verification of the amount of substance of oxygen in this CRM, stability, and dependence of the amount of substance of oxygen on the inner pressure.

Metrological Traceability

This CRM was prepared by the gravimetric preparation method, using a mass comparator and weights that are traceable to the International System of Units (SI). The purity of the pure nitrogen and oxygen used for the preparation of this CRM was determined with SI-traceable calibration gases. Therefore the certified values are traceable to the SI.

Expiration of Certification

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Sample Form

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Instructions for Storage

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Instructions for Use

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use. To avoid contamination, we also recommend checking all piping joints for leakage. This CRM should be used only when the internal pressure is 1 MPa or more.

Precautions for Handling

This CRM should be handled in compliance with any relevant regulations relating to high-pressure gas. Use personal protective equipment when handling this CRM. Keep away from open flames. The CRM should be used in a well-ventilated place as this CRM is a simple asphyxiant gas. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

This CRM is prepared by the gravimetric blending method, using pure nitrogen (Japan Fine Products, G1 grade) and oxygen (NMIJ CRM 3404-a).

Technical Information

This CRM contains argon at a molar fraction in the range 0.3 μ mol/mol to 1 μ mol/mol.

NMIJ Analysts

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Revision history

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