

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 4406-a01

Sulfur Hexafluoride, Hexafluoroethane and

Tetrafluoromethane in Nitrogen (0.5%)



This certified reference material (CRM) is a secondary gas mixture, which was produced based on NMIJ's quality system in compliance with JIS Q 0034 (ISO GUIDE 34). This CRM is intended for the calibration of instruments, working standards and for other applications.

Certified Values

The CRM is the mixture of sulfur hexafluoride (SF₆), hexafluoroethane (C₂F₆) and tetrafluoromethane (CF₄) concentrations. The certified values for these gases are given in the following table. The expanded uncertainties were determined using coverage factor ($k=2$), corresponding to an estimated confidence interval of approximately 95 %.

	CAS No.	Certified value, Substance fraction ($\mu\text{mol/mol}$)	Expanded uncertainty, Substance fraction ($\mu\text{mol/mol}$)
Sulfur Hexafluoride	2551-62-4	5267	26
Hexafluoroethane	76-16-4	5151	26
Tetrafluoromethane	75-73-0	5071	25

Analytical Methods

The certified values were determined using a Fourier transform infrared spectrometer (FT-IR), which was calibrated by primary reference gases traceable to the International System of Units (SI).

Traceability

This CRM is a secondary reference gas calibrated by the primary reference gases and is traceable to the International System of Units (SI).

Mutual Recognition Arrangement

This CRM complies with the Mutual Recognition Arrangement (CIPM MRA). The certified values and the uncertainties are registered in the database of Bureau International des Poids et Mesures (BIPM) KCDB

(<http://kcdb.bipm.org/AppendixC/default.asp>)

Expiration of Certification

The certification of this CRM is valid until July 31, 2013 provided that the mixture 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 10 L. Specification of the outlet of the cylinder is W22mm- ϕ 14 (JIS W22-14) thread right male. The nominal pressure of the gas in the cylinder at certification is exceeding 14 MPa.

[This document is just explanation translated from the original Japanese certificate and some information is omitted from it.]

Cylinder Handling Information

The CRM should be kept in compliance with the High Pressure Gas Safety Law. The cylinder should be maintained below 40 °C and away from the direct sunlight. Fasten the cylinder to prevent from falling down. Follow the material safety data sheet (MSDS). Return this CRM to Metrology Management Center after use, or after the expiry date.

Instruction for Use

NMIJ recommends that the CRM should be left for sufficient time before use and not be used unless the inner pressure is over 0.5 MPa. Regulators, valves, piping, measuring instruments, and so on should be purged several times with the CRM to avoid contamination gas before use.

Mixture Preparation

Preparation of the gas mixtures was performed by Japan Fine Products Corporation.

NMIJ Analysts

The technical manager for this CRM is K. Kato, the production manager is N. Aoki, and the analysts are N. Aoki, N. Matsumoto, and K Kato.

Technical Information

Customers will be notified in the case of important revision, such as a change in the certified values. Technical information about this CRM can be obtained from the contact shown below.

Reproduction of Certificate

In reproducing this certificate, it should be clearly indicated that the document is a copy.

March 30, 2010

Tamotsu Nomakuchi
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/>