

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 4220-a  
No. +++

## Potassium Perfluorooctanesulfonate in Methanol

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 instruments or for confirming the validity of analytical methods or instruments during quantification of perfluorooctanesulfonic acid (PFOS) and its salts.

**Certified Value**

The certified value for this CRM is the concentration (mass fraction) 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, Mass fraction (mg/kg)	Expanded uncertainty, Mass fraction (mg/kg)
Potassium perfluorooctanesulfonate (Potassium heptadecafluorooctane-1-sulfonate)	2795-39-3	9.93	0.15

**Analysis**

The certified value of this CRM was obtained by multiplying the dilution ratio of potassium perfluorooctanesulfonate in the prepared solution with the purity of this compound. The purity of potassium perfluorooctanesulfonate was determined by the freezing point depression method using a differential scanning calorimeter (DSC) and by the coulometric titration method using a Karl Fisher (KF) titrator.

**Metrological Traceability**

The purity of potassium perfluorooctanesulfonate was determined by the freezing point depression and coulometric titration methods. The certified value of this CRM was calculated using these results and is traceable to the International System of Units (SI).

**Mutual Recognition Arrangement under Meter Convention**

This certificate is consistent with the calibration and measurement capabilities (CMCs) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures (CIPM). Under the MRA, all participating institutes recognize the validity of each other's calibration and measurement certificates for the quantities, ranges, and measurement uncertainties specified in Appendix C (for Appendix C of MRA, see <http://kcdb.bipm.org/AppendixC/default.asp>).

**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 in the form of a colorless and clear liquid at room temperature. This CRM of ca. 1 g in net volume is sealed in a 2-

mL amber glass ampoule under argon atmosphere.

**Homogeneity**

The homogeneity of this CRM was determined by analyzing 10 ampoules selected by random sampling of 405 subdivided ampoules. The peak area of the main component of each ampoule was measured by a high-performance liquid chromatograph equipped with a mass spectrometer (LC/MS). The variation of the results was estimated by ANOVA. The homogeneity of the material is reflected in the uncertainty of the certified value.

**Instructions for Storage**

This CRM should be stored at a temperature between 15 °C and 25 °C and shielded from light.

**Instructions for Use**

This CRM is for laboratory use only. This CRM should be used promptly once the ampoule is opened.

**Precautions for Handling**

Keep away from heat and ignition sources. Wear personal protective equipment such as safety mask and gloves in handling. The use, handling, and storage of this CRM should be carried out according to the laws regulating the components of this CRM. Refer to the safety data sheet (SDS) on this CRM before use.

**Preparation**

This CRM was prepared by dissolving commercial potassium perfluorooctanesulfonate into methanol. Of the solution, 1 g was dispensed and sealed in an amber glass ampoule under argon atmosphere.

**Technical Information**

The density value of this CRM is 0.7913 g/cm<sup>3</sup> at 20 °C. This CRM contains branched potassium perfluorooctanesulfonate (0.052 mg/kg). The concentration of this impurity in this CRM was estimated by using LC/MS.

**NMIJ Analysts**

The technical manager for this CRM is NUMATA M. The production manager is HANARI N. The analysts are HANARI N., ITOH N., ISHIKAWA K., YARITA T., IWASAWA R. and AOYAGI Y.

**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, 2020

ISHIMURA Kazuhiko

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

February 1, 2012: The expiration date of this certificate was changed to “March 31, 2015” from “March 31, 2013.”

February 4, 2014: The expiration date of this certificate was changed to “March 31, 2019” from “March 31, 2015.”

February 4, 2014: The description on “Mutual Recognition Arrangement under Meter Convention” was added.

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

February 13, 2018: The description in “Expiration of Certification” was changed to “one year from the date of shipment.”

Sample