

National Institute of Advanced Industrial Science and Technology  
National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 4228-b  
No. +++



## Water in Anisole/Diethylene Glycol Dimethyl Ether (1 mg/g)

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 validating analytical methods and instruments, and calibrating instruments during quantification of water by Karl Fischer (KF) titration.

**Certified Value**

The certified value of this CRM is mass fraction of water in anisole/diethylene glycol dimethyl ether 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 %.

Substance	CAS No.	Certified value Mass fraction (mg/kg)	Expanded uncertainty Mass fraction (mg/kg)
Water	7732-18-5	1019	16

**Analysis**

The certified value of this CRM was weighted mean of the analytical results obtained by coulometric and volumetric KF titrations, where the reciprocal of the uncertainty of the result obtained by each method was used as the weight.

**Metrological Traceability**

The certified value of this CRM was determined by the coulometric and volumetric titrations as the primary methods of measurement. The analytical results of coulometric KF titrations were obtained using the coulometric KF titrator whose electric charge was verified by the Japan Calibration Service System (JCSS)-calibrated standard resistor, voltmeter and frequency counter. The analytical results of volumetric KF titrations were obtained using a KF reagent, the titer of which was determined by NMIJ CRM 4228-a. The amount of a sample injected to the titrator was measured by JCSS-calibrated balance. The certified value, therefore, is traceable to the International System of Units (SI).

**Expiration of Certification**

This certificate is valid for one year from the date of shipment, provided that the material remains unopened and is stored in accordance with the instructions given in this certificate.

**Description of the Material**

This CRM is a mixture of anisole and diethylene glycol dimethyl ether. This CRM is in the form of a clear liquid and it of ca. 8 mL in net volume is sealed in an amber glass ampule.

**Instructions for Storage**

This CRM should be stored in a clean place at temperatures of 15 °C to 30 °C and protected from light.

**Instructions for Use**

This CRM is for laboratory use only. Before opening the ampule shake gently and leave to stand for several minutes. To avoid

Date of Shipment: XXXXX XX, 20XX

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sample evaporation, and moisture sorption or desorption, this CRM should be used promptly once the ampule is opened. Samples should be taken from the ampule using a gas-tight syringe.

### Precautions for Handling

Keep away from heat and ignition sources. Wear personal protective equipment such as safety glasses, safety mask and protective gloves when handling this CRM. The use, handling, storage and disposal of this CRM should be conducted according to 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 Kanto Chemical Co., Inc. by mixing anisole with diethylene glycol dimethyl ether in a 90.5 % to 9.5 % weight ratio. Water was then added to achieve a concentration of 1 mg/g. The amber glass ampule was filled with 8 mL of the solution.

### Technical Information

The density of this CRM at the time of certification was 0.9848 g/cm<sup>3</sup> (25 °C), 0.9895 g/cm<sup>3</sup> (20 °C) and 0.9942 g/cm<sup>3</sup> (15 °C).

### NMIJ Analysts

The technical manager for this CRM is HANARI N., the production manager is NAKAMURA K., and the analysts are NAKAMURA K., HIBINO Y., and ORIHARA Y.

### 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.

January 25, 2024

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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