Certificate of the Reference Material

Name of the Material	:	Multi Anion Standard I
Material Code	:	UME CRM 2281
Issue Date	:	12.04.2023
Revision Date	:	28.11.2024 (Revision history can be found on the last page)
Validity Period of the Certificate	:	24 months from the sales date
Certified Values	:	

Parameter	Mass Fraction [1,2] (mg/kg)	Uncertainty [2,3] (mg/kg)
Cl^-	999.2	2.1
NO_3^-	999.4	3.2
SO_4^{2-}	999.4	4.4

[1] The certified value was determined by using High Performance Ion Chromatography (HP-IC) and gravimetric solution preparation methods.

[2] The certified values and uncertainties are traceable to the International System of Units (SI).

[3] The expanded uncertainty of the certified value includes characterization, homogeneity, stability components and is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with GUM “Guide to the Expression of Uncertainty in Measurement”.

TÜBİTAK UME, as a reference material producer, has been accredited by TÜRKAK according to TS EN ISO 17034 with the accreditation number AB-0001-RM.

Sales Date

Assoc. Prof. Mustafa ÇETİNTAŞ
Acting Director

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Informative Values

Parameter	Value [1] (kg/m^3)	Uncertainty [2] (kg/m^3)
Density (20 °C)	1002.033	0.044

[1] Calculated from three independent measurements from each of the three different units performed by one laboratory.

[2] The expanded uncertainty is calculated from the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %.

Description

The material is approximately 100 mL solution filled into high density polyethylene (HDPE) bottle after dissolution, dilution and homogenization of KCl, KNO_3 and K_2SO_4 salts. Detailed information about the preparation of the material can be found in the certification report.

Intended Use

This material is intended to be used as a calibration standard for determination of Cl^-, NO_3^- and SO_4^{2-} anions.

Instructions for Use

Before opening the bottle, it should be allowed to equilibrate with the ambient temperature and shaken before opening the cap. All precautions should be taken to prevent contamination and evaporation during the use of the material.

The homogeneity of the solution for Cl^-, NO_3^- and SO_4^{2-} has been proven by within-bottle and between-bottle homogeneity tests. The minimum sample amount used in the measurements for certification was 570 µL. The minimum sampling amount should be determined by the end user according to the measurement capability, taking into account the uncertainty of the working solution to be prepared.

This material can be safely dispatched under conditions where the temperature does not exceed 45 °C for up to 2 weeks, i.e. at ambient temperature without applying any cooling elements.

Storage Conditions

The material should be stored between (+2 to +8) °C. TÜBİTAK UME cannot be held responsible for any changes that might happen to the material due to non-compliance with the instructions for use, and the storage conditions stated in the certificate.

Safety Information

The material is produced for laboratory use only. General laboratory precautions should be followed during storage and use of the material. It is recommended to use and dispose of the material according to the existing safety rules. Please refer to the Safety Data Sheet (SDS) before any use of the material.

Participants

Information about the laboratory participated in the characterization study is presented in the following table.

Laboratory	Address
TÜBİTAK UME	TÜBİTAK Gebze Yerleşkesi, Barış Mahallesi, Dr. Zeki Acar Caddesi No.1, 41470 Gebze - Kocaeli / Türkiye

Methods and/or Techniques Used for the Determination of the Certified Values

High Performance Ion Chromatography (HP-IC) and gravimetric solution preparation techniques were used in the characterization study.

Revision History

Date	Remarks
12.04.2024	First issue.
28.11.2024	Certificate is updated to adapt it to the current format of certificate for reference material.