TÜBİTAK
ULUSAL METROLOJİ ENSTİTÜSÜ

Certificate of the Reference Material

Name of the Material : Boric Acid

Material Code : UME CRM 1207

Issue Date : 28.06.2021

Revision Date : 28.06.2021 (Revision history can be found on the last page)

Validity Period of the Certificate : 12 months from the sales date

Certified Values :

Parameter	Mass Fraction [4]	Uncertainty [4,5]	Unit
B [1]	17.58	0.62	g/100 g
Fe [1]	97.5	8.8	mg/kg
Si [2]	2.98	0.51	mg/kg
Cl^- [3]	95.2	5.8	mg/kg
SO_4^{-2} [3]	156	13	mg/kg

[1] The certified value was determined by using ICP-OES and ID-ICP-MS methods.
[2] The certified value was determined by using ICP-OES and ICP-MS methods.
[3] The certified value was determined by using IC method. Methods for determination of total sulphur by ICP-MS and ICP-OES for SO_4^{-2} and for determination of total chlorine by ICP-OES for Cl^- were used as supporting methods.
[4] The certified values and uncertainties are traceable to the International System of Units (SI).
[5] 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”.

Sales Date

Dr. Mustafa ÇETİNTAŞ
Director

Informative Values

Parameter	Mass Fraction [1]	Uncertainty [1,2]	Unit
B_2O_3	56.6	2.0	g/100 g

[1] Calculated from the values on the table of atomic weights published by IUPAC, assuming that all of the certified amount of B is in the form of B_2O_3.

[2] The expanded uncertainty includes the uncertainty on the certified value and the uncertainties on the atomic weights 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 %.

Description

The material is approximately 120 g boric acid which is filled into the amber glass bottle after mixing the boric acid which was previously spiked with Fe^{3+} and Cl^-, dried and milled with unspiked boric acid followed by milling, sieving and homogenisation. The detailed information can be found in certification report.

Intended Use

This material is intended to be used for method validation of the determination of B, Fe, Si, Cl^- and SO_4^{-2} and quality control purposes in this field.

Instructions for Use

Before opening and taking a sample, the bottle should be shaken slowly and rotated in three dimension to minimize possible agglomeration and re-homogenize the content.

Minimum sample intake is 1 g. The material can be transported providing that the temperature is kept below 45 °C and the duration is less than 2 weeks. The material was not subjected to any drying process before the measurements during the certification. The determination of moisture content of the material was carried out according to standard *TS 2481 Boric Acid*. Since the moisture content was found to be so small that it did not affect the certified value and the associated uncertainties, it has not been included in the calculations. The certified values are given as the dry weight basis. Although it is known that the material is hydrophilic, all precautions should be taken in order to prevent contamination and gathering moisture from its environment.

Storage Conditions

The material should be stored at (18 ± 4) °C in dark and clean environment.

TÜBİTAK UME cannot be held responsible for changes that might happen to the material at customer's premises due to noncompliance with the instructions for use, and the storage conditions given.

Safety Information

The usual laboratory safety measures apply.

It is strongly recommended that the material must be handled and disposed according to the safety guidelines where applicable. Please refer to the Safety datasheet (SDS) before any use of the material.

Participants

Information about the laboratory participated in the characterization study is given 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

Information about the techniques used in the characterisation studies are given in the following table.

Method/Technique	Parameter
Isotope Dilution Inductively Coupled Plasma Mass Spectrometry (ID-ICP-MS)	B, Fe
Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Si
Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)	B, Fe, Si
Ion Chromatography (IC)	Cl^-, SO_4^{-2}

Revision History

Date	Remarks
28.06.2021	First issue.