

Certificate of the Reference Material

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Name of the Material : Benzoic Acid  
Material Code : UME CRM 1504  
Issue Date : 23.09.2021  
Revision Date : 28.11.2024 (Revision history can be found on the last page)  
Validity Period of the Certificate : 12 months from the sales date  
Certified Values :

Parameter	Certified Value <sup>[3]</sup>	Uncertainty <sup>[3, 4]</sup>	Unit
Gross Calorific Value <sup>[1]</sup>	26473	32	J/g
Purity <sup>[2]</sup>	99.96	0.27	g/100 g

[1] The certified value has been determined by the oxygen bomb method using isoperibol calorimetry.

[2] The certified value has been determined using potentiometric titration and qNMR methods.

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

[4] The expanded uncertainty of 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

The following pages are an integral part of the certificate. The use of current certificate is customers' responsibility.

Most recent certificate can be downloaded from [www.ume.tubitak.gov.tr](http://www.ume.tubitak.gov.tr).

### Description

The material consists of 10 or 50 tablets in an amber coloured bottle, each containing approximately one gram of benzoic acid. Additional information about the preparation of the material is given in the certification report.

### Intended Use

This material is intended to be used in the calibration of calorimeters used for calorific value measurements and calibration of benzoic acid measurements, validation of methods and quality control activities in this field.

### Instructions for Use

During the opening and use of the bottle, all precautions must be taken to prevent contamination and moisture uptake of the material, and the bottle cap should not be left open for a long time.

Each tablet in the bottle is produced in a weight (approximately 1 gram) that will not damage the calorimeter combustion chambers. The user can use the appropriate amount of material in the combustion chamber according to the calorific value measurement standard used. The minimum sample intake used for the determination of benzoic acid purity by potentiometric titration is 120 mg, and the minimum sample intake used for the determination of purity by qNMR is 10 mg. This material can be safely dispatched under conditions where the temperature does not exceed 50 °C for up to four weeks, i.e. at ambient temperature without applying any cooling elements.

### Storage Conditions

The material should be stored at  $(18 \pm 5)$  °C in dark 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 material should not come into contact with skin and eye. After the calorific value measurement is carried out, the gases formed in the bomb must not be inhaled. It is strongly recommended that the material must be handled and disposed according to the safety guidelines where applicable. Please refer to the Safety Data Sheet before any use of the material.

## Participants

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

Method/Technique	Parameter
Oxygen Bomb Method (Calorimeter)	Gross Calorific Value
Potentiometric Titration	Purity
Quantitative Nuclear Magnetic Resonance Spectroscopy (qNMR)	Purity

## Revision History

Date	Remarks
23.09.2021	First issue.
27.12.2022	The expression of "50 tablets" has been added to the description of the material.
28.11.2024	Certificate is updated to adapt it to the current format of certificate for reference material.