TÜBİTAK
ULUSAL METROLOJİ ENSTİTÜSÜ

Certificate of the Reference Material

Name of the Material	:	Sulfur in Diesel Certified Reference Material
Material Code	:	UME CRM 1203-2
Issue Date	:	24.08.2015
Revision Date	:	18.09.2019 (Revision history can be found on the last page)
Validity Period of the Certificate	:	1 year from the sales date
Certified Values	:	

Parameter	Mass Fraction [2] [mg/kg]	Uncertainty [3] [mg/kg]
Sulfur [1]	14.5	1.2

[1] Certified value was determined using isotope dilution ICP-MS method.
[2] The certified value and the uncertainty are traceable to the International System of Units (SI).
[3] 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

Dr. Mustafa ÇETİNTAŞ
Director

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Informative Values

Parameter	Value
Density	822.81 kg/m^3 [1]

[1] The measurements were performed according to ISO 12185:1996 standard in TÜBİTAK UME at (20 ± 1) °C.

Description

The material is about 100 mL of diesel in an aluminum bottle. Additional information is presented in the certification report.

Intended Use

This material is intended to be used for method development and method validation for the determination of sulfur mass fraction in diesel and quality control purposes.

Instructions for Use

The bottle must be shaken before opening for assurance of homogeneity. All precautions must be taken in order to prevent degradation or contamination with air intact. Minimum sample intake is 0.25 mL. The material can be safely dispatched at ambient temperature where the temperature does not exceed 50 °C and the transportation period of 4 weeks.

Storage Conditions

The material should be stored in temperature conditions (5 ± 3) °C. The bottle should be thoroughly mixed before use in order to exclude the possible effects due to condensation of the material in upper part of the container. TÜBİTAK UME cannot be held responsible for changes that might happen to the material at customer's premises due to noncompliance to the instructions for use, and the storage conditions given in the certificate.

Safety Information

Usual laboratory precautions apply. It is strongly recommended that the material must be handled and disposed according to the safety guidelines where applicable. All safety precautions, e.g. working in a fume hood and or using suitable masks, must be taken. All precautions for flammable materials are also valid for this material. Please refer to the Safety Datasheet before any use of the material.

Participants

Information about the laboratory participated in the characterization study is given in the table below.

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

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

The information about the method used in the characterization study is given below.

Method/Technique	Parameter
Isotope Dilution Inductively Coupled Plasma Mass Spectrometry (ID-ICP-MS)	S

In ID-ICPMS method, certified reference materials NIST SRM 3154 and IRMM 646 were used as calibration standard and isotopically enriched standard, respectively. Once spiked with the isotopically enriched standard, about 0.2 g of the material was decomposed in a microwave dissolution system (Milestone Ethos Plus) using quartz inserts. After diluting with deionized water, sulfur isotope ratios ($^{32}S/^{34}S$) were measured using high resolution ICP-MS (Thermo Element 2) in medium resolution mode. NIST SRM 2723b and ERM-EF674a matrix certified reference materials were used in method validation studies. All solution preparations in characterization study were performed gravimetrically using analytical balances checked before every use with weight sets calibrated by TÜBİTAK UME with traceability to national standards.

Revision History

Date	Remarks
24.08.2015	First publication
31.10.2018	Certificate is updated due to format change of the document.
18.09.2019	Information about shipping conditions is added. Certificate is updated due to changes in the format of certificate for reference materials.