

# CERTIFICATE OF ANALYSIS

## ERM<sup>®</sup> - EF213

PETROL		
	Mass fraction	
	Certified value <sup>1)</sup> [mg/kg]	Uncertainty <sup>2)</sup> [mg/kg]
Sulfur	9.1	0.8
<p>1) Unweighted mean of three sets of results obtained using isotope-dilution mass spectrometry applied as primary method of measurement. The value is traceable to the International System of Units (SI).</p> <p>2) The certified uncertainty is the expanded uncertainty estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM) with a coverage factor <math>k = 2</math>, corresponding to a level of confidence of about 95 %.</p>		

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used is 0.20 g.

### NOTE

European Reference Material ERM<sup>®</sup>-EF213 was produced and certified under the responsibility of BAM in cooperation with IRMM and LGC according to the principles laid down in the technical guidelines of the European Reference Materials<sup>®</sup> co-operation agreement between BAM-IRMM-LGC. Information on these guidelines is available on the internet (<http://www.erm-crm.org>).

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## DESCRIPTION OF THE SAMPLE

This material is a petroleum product containing sulfur (S) in its natural forms, closely matching commercial petrol fuels. The absence of artificially added sulfur species avoids any effects arising from species specific analytical methods. A suitable supply of petrol was obtained in bulk from ESSO Deutschland GmbH, Ingolstadt, Germany. The material was dispensed into 19 mL portions into clear borosilicate glass ampoules. More details can be found in the certification report.

## ANALYTICAL METHOD USED FOR CERTIFICATION

Isotope dilution thermal-ionisation mass spectrometry (ID-TIMS) applied as a primary method of measurement

Isotope dilution inductively-coupled plasma mass-spectrometry (ID-ICP-MS) applied as a primary method of measurement

Results using methods described in EN ISO 20846, ASTM D5453-04 and IP-532/05 did not differ from the certified values.

## PARTICIPANTS

- Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin (DE) (ISO 17025 accreditation DAP PL-2614.14)
- EC-JRC, Institute for Reference Materials and Measurements, Isotope Measurements Unit, Geel (BE) (ISO 17025 accreditation BELAC accepted; no certificate at 22/1/2007; ISO Guide 34 accreditation BELAC 268-TEST)
- LGC Ltd., Teddington (UK) (ISO 17025 accreditation UKAS 0003G)
- Referat Laboratorium Celne, Terespol (PL) (ISO 17025 accreditation PCA AB656)

## SAFETY INFORMATION

R12	Extremely flammable
R38	Irritating to skin
R45	May cause cancer
R48/20/21/22	Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R65	Harmful: may cause lung damage if swallowed.
R67	Vapours may cause drowsiness and dizziness.
S2	Keep out of the reach of children
S23	Do not breathe vapour
S24	Avoid contact with skin
S29	Do not empty into drains
S43	In case of fire, use foam/dry powder/CO <sub>2</sub> . Never use water jets.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)
S53	Avoid exposure - obtain special instructions before use.
S61	Avoid release to the environment.
S62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

For non-fuel use only - "Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use."

## INSTRUCTIONS FOR USE

This is a highly volatile material and care should be taken to minimise evaporation during handling and preparation of samples for analysis. Before opening, the contents should be mixed by carefully inverting the ampoule several times. For best results, samples should be prepared gravimetrically. The material should be used immediately after the ampoule seal has been broken. The certified values are not valid (to within the stated uncertainties) for any material in an ampoule which has been left open for more than 5 minutes, due to the volatility of the petrol.

The main purpose of the materials is to assess method performance, i.e. for checking accuracy of analytical results. As any reference material, it can also be used for control charts or validation studies.

Comparing an analytical result with the certified value (see also ERM Application Note 1; [www.erm-crm.org](http://www.erm-crm.org))

A result is unbiased if the combined uncertainty of measurement and certified value covers the difference between the certified value and the measurement result.

Use in quality control charts

The materials can be used for quality control charts. Different CRM units will give the same result as heterogeneity was found negligible.

Use as a calibrant

It is not recommended to use matrix materials as calibrants. If used nevertheless, the uncertainty of the certified value shall be taken into consideration in the final estimation of measurement uncertainty.

## STORAGE

The materials should be stored at  $20 \pm 5$  °C in the dark. Exposure to light will lead to browning of the material. However, BAM cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

## LEGAL NOTICE

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## NOTE

A detailed technical report is available on [www.erm-crm.org](http://www.erm-crm.org). A paper copy can be obtained from BAM on request.