



# CERTIFIED REFERENCE MATERIAL BCR<sup>®</sup> – 460

## CERTIFICATE OF ANALYSIS

COAL		
	Mass Fraction based on dry mass	
	Certified value <sup>1)</sup> [mg/kg]	Uncertainty <sup>2)</sup> [mg/kg]
F	225	8
<p>1) Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method. The value is on a dry mass basis and 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 250 mg.

### NOTE

This material has been certified by BCR (Community Bureau of Reference, the former reference materials programme of the European Commission). The certificate has been revised under the responsibility of IRMM.

Brussels, June 1993

Latest revision: May 2007

Signed: \_\_\_\_\_

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Indicative Values		
	Mass Fraction based on dry mass	
	Indicative value <sup>1)</sup> [mg/kg]	Uncertainty <sup>2)</sup> [mg/kg]
Cl	59	18
<p>1) Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method. The value is on a dry mass basis and 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>		

## DESCRIPTION OF THE SAMPLE

The material consists of 40 g South African Rietspruit coal powder in a glass bottle. Additional information on the preparation of the material and the certified value is given in the certification report.

## ANALYTICAL METHOD USED FOR CERTIFICATION

Acidimetric titration after combustion  
 Argentometric titration after combustion  
 Argentometric titration after pyrohydrolysis  
 Ion chromatography after combustion  
 Ion chromatography after steam distillation  
 Instrumental neutron activation analysis  
 Ion selective electrode after combustion  
 Ion selective electrode after pyrohydrolysis  
 Ion selective electrode after steam distillation  
 Neutron activation analysis with fast neutrons  
 Visual spectrometry

## PARTICIPANTS

Federal Institute for Materials Research and Testing (BAM), Berlin (DE)  
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 European Centre for Coal Specimen, Egelshoven (NL)  
 Netherlands Energy Research Foundation (ECN), Petten (NL)  
 Elsam, Aabenraa (DK)  
 Enel, Pisa (IT)  
 Experimental Station for Fuel, San Donato (IT)  
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 INERIS, Verneuil-en-Halatte (FR)  
 KEMA N.V., Arnhem (NL)  
 Laborelec, Linkebeek (BE)  
 Ministry of Economic Affairs, Brussels (BE)  
 Ruhrkohle AG, Essen (DE)  
 Technical Research Centre (VTT), Espoo (FI)  
 TÜV, Essen (DE)  
 University of Ghent, I.N.W., Ghent (BE)

## SAFETY INFORMATION

The usual laboratory safety precautions apply.

## INSTRUCTIONS FOR USE

The main purpose of the materials is to assess method performance, i.e. 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

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

See also ERM Application Note 1; [www.erm-crm.org](http://www.erm-crm.org)

### Use in quality control charts

The materials can be used for quality control charts. Different CRM units will give the same result as sufficient homogeneity has been demonstrated.

### 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.

Before the bottle is opened, it should be shaken manually for 5 min so that the material is re-homogenised. The correction of dry mass should be made on a separate portion of 100 mg which should be dried in an oven at 102 °C for 3-4 h until constant mass is attained (successive weighings should not differ by more than 0.2 mg).

## STORAGE

The material shall be stored at 18 °C in the dark.

However, the European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

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## NOTE

A technical report on the production of BCR-460 is available on the internet (<http://www.irmm.jrc.be>). A paper copy can be obtained from IRMM on request.