

# CERTIFICATE OF ANALYSIS

## ERM<sup>®</sup> - CC690

CALCAREOUS SOIL		
Parameter	Mass fraction	
	Certified value <sup>1</sup> [mg/kg]	Uncertainty <sup>2</sup> [mg/kg]
Ce	49.1	2.5
Dy	2.90	0.28
Gd	3.2	0.4
La	24.4	1.7
Nd	19.1	2.2
Sc	7.9	0.9
Sm	3.5	0.4
Tb	0.50	0.07
Tm	0.232	0.026
Yb	1.57	0.19
Th	7.6	0.8
U	1.90	0.23

1) Certified values are unweighted means of 7 to 11 data sets. Certified values represent total contents. Certified values are traceable to SI provided the described drying procedure is applied.

2) Estimated expanded uncertainty  $U$  with a coverage factor  $k = 2$ , corresponding to a level of confidence of about 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO, 1995. Uncertainty contributions arising from characterisation as well as from homogeneity and stability assessment were taken into consideration. When the reference material is used to assess the performance of a procedure, the user should refer to the recommendations of the certification report.

This certificate is valid for one year after purchase.

Sales date:

The minimum sample intake is 100 mg.

### NOTE

European Reference Material ERM<sup>®</sup>-CC690 was originally certified as BCR-690. It was produced and certified under the responsibility of the IRMM 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>).

Accepted as an ERM<sup>®</sup>, Geel, May 2004

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Signed: 

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## DESCRIPTION OF THE SAMPLE

The material consists of calcareous soil in a glass bottle containing approximately 70 g of powder. Information on the preparation and the certification of the rare earth elements Ce, Dy, Gd, La, Nd, Sc, Sm, Tb, Tm and Yb, and of the elements Th and U is given in the certification report.

## ANALYTICAL METHODS USED FOR CERTIFICATION

Inductively coupled plasma atomic emission spectrometry  
Inductively coupled plasma mass spectrometry (low, medium and high resolution)  
Isotope dilution inductively coupled plasma mass spectrometry  
Isotope dilution thermal ionisation mass spectrometry  
Instrumental neutron activation analysis  
k<sub>0</sub> Instrumental neutron activation analysis

## PARTICIPANTS

Preparation, homogeneity study

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Analyses

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## SAFETY INFORMATION

Not applicable.

## INSTRUCTIONS FOR USE

Before a bottle is opened, it should be shaken manually for 1 min so that the material within is re-homogenised.

The analytical sample for analysis should be taken as it is. The correction to dry mass should be made by taking a separate portion of 1 g and drying in an oven at 105 °C until constant mass is attained (successive weighings should not differ by more than 1 mg). The recommended minimum sample intake is 100 mg.

The reference material is intended for method validation.

## STORAGE

Although no effects are expected at room temperature, it is recommended that the bottles be kept closed at < 20 °C in a refrigerator, in the dark. The material picks up moisture when in prolonged contact with humid air. Therefore, after having been opened, the bottle with remaining material should be stored in a dry empty desiccator. Spoilage by moulds may occur at moisture contents exceeding 8-10 % by mass and ruins the whole sample.

## **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 IRMM on explicit request.

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