



EUROPEAN COMMISSION  
JOINT RESEARCH CENTRE

Institute for Reference Materials and Measurements (Geel)

# CERTIFIED REFERENCE MATERIAL BCR<sup>®</sup> – 287

## CERTIFICATE OF ANALYSIS

THERMALLY REFINED LEAD			
	Mass fraction		Number of accepted sets of data p
	Certified value <sup>1)</sup> [mg/kg]	Uncertainty <sup>2)</sup> [mg/kg]	
Ag	15.20	0.21	15
Bi	67.3	1.1	18
Cd	0.356	0.024	13
Cu	0.98	0.05	17
Sb	0.040	0.015	6
Sn	< 0.05 <sup>3)</sup>		4
Tl	0.73	0.04	9
Zn	< 0.1 <sup>3)</sup>		7
<p>1) Unweighted mean value of the means of p accepted sets of data, each set being obtained in a different laboratory and/or with a different method. The value is traceable to the International System of Units (SI).</p> <p>2) Half-width of the 95 % confidence interval of the mean defined in (1)</p> <p>3) The upper limit is supported by 7 sets of data, either actually measured values or upper limits. The true value lies below the stated value with a probability of 95 %.</p>			

This certificate is valid for five years after purchase.

Sales date:

The minimum amount of sample to be used is 1 g.

### 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, December 1984

Latest revision: August 2015

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

Prof. Dr. Hendrik Emons  
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Joint Research Centre  
Institute for Reference Materials and Measurements  
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Additional Material Information	
	Mass fraction
	Value <sup>1)</sup> [µg/kg]
As	3
Ni	24
Se	50
Te	200
1) Unweighted mean value of the means of accepted datasets. Each set was obtained in a different laboratory and/or with a different method. The value is traceable to the International System of Units (SI).	

## DESCRIPTION OF THE SAMPLE

The material consists of thermally refined lead. The material is available in two forms:

BCR-287A: solid squares of about 60 mm x 60 mm x 12 mm

BCR-287B: chips in glass bottles containing about 160 g

## ANALYTICAL METHOD USED FOR CERTIFICATION

Neutron activation analysis

Photon activation analysis

Flame atomic absorption spectrometry

Electrothermal atomic absorption spectrometry

Inductively coupled plasma emission spectrometry

Direct current plasma emission spectrometry

Laser enhanced ionisation (optogalvanic spectrometry)

Spectrophotometry

X-ray fluorescence

These techniques of final determination were preceded by dry or wet sample treatments as appropriate.

## PARTICIPANTS

Accumulateurs Tudor, Archennes (BE)

Associated Lead Manufacturers, Research Laboratories, Greenford (GB)

Blei- und Silberhütte Braubach, Braubach (DE)

Bundesanstalt für Materialforschung und -prüfung, Berlin (DE)

Chloride Power Storage, Swinton (GB)

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ENEA, Lab. Chimica Analitica, Roma (IT)

European Commission, Joint Research Centre, Ispra (IT)

Laboratoire National d'Essais, Paris (FR)

Metallurgie Hoboken-Overpelt, Hoboken (BE)

Minemet Recherche, Trappes (FR)

Norddeutsche Affinerie AG, Hamburg (DE)

Preussag AG Metall, Oker/Harz (DE)

Preussag Boliden Blei, Nordenham (DE)

Rijksuniversiteit Gent, Instituut voor Nucleaire Wetenschappen, Gent (BE)

Tonolli Grezzi (Sameton), Paderno Dugnano-Mi (IT)

Vieille Montagne, Angleur (BE)

## SAFETY INFORMATION

The usual laboratory safety precautions apply.

## INSTRUCTIONS FOR USE

The main purpose of the material 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.

When the solid material is used for spark emission spectrometry, the usual sample treatment (mechanical machining to have a fresh surface) should be applied. However, homogeneity for this low sample intake has not been demonstrated.

## 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.

## LEGAL NOTICE

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## NOTE

A technical report on the production of BCR-287 is available on the internet (<http://www.irmm.jrc.be>). A paper copy can be obtained from IRMM on request.

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