

# CERTIFICATE OF ANALYSIS

## ERM<sup>®</sup>-EB507

Alloying Elements in White Gold			
	Certified value <sup>1)</sup>	Uncertainty <sup>2)</sup>	
Element	Mass fraction in %		
Au	75.10	±	0.11
Ag	3.02	±	0.05
Cu	14.69	±	0.05
Ni	4.99	±	0.04
Zn	2.107	±	0.016

<sup>1)</sup> Unweighted mean value of the means of accepted sets of data, each set being obtained by at least 6 laboratories and/or with different methods of measurement. The values are traceable to the SI (Système International d'Unités) by the use of pure substances of known stoichiometry for calibration.

<sup>2)</sup> Estimated expanded uncertainty  $U$  with a coverage factor of  $k = 2.5$ , corresponding to a level of confidence of about 95 %, as defined in the ISO/IEC Guide 98-3:2008 Uncertainty of measurement -- Part 3: Guide to the expression of uncertainty in measurement (GUM:1995).

This certificate is valid until 05/2064; this validity may be extended as further evidence of stability becomes available.

Accepted as an ERM<sup>®</sup>, 08.05.2014

BAM Department 1  
Analytical Chemistry;  
Reference Materials

BAM Division 1.6  
Inorganic Reference Materials

Prof. Dr. U. Panne  
(Head of Department)

Dr. S. Recknagel  
(Head of Division)

## NOTE

European Reference Material ERM<sup>®</sup>-EB507 was certified under the responsibility of BAM Bundesanstalt für Materialforschung und -prüfung in cooperation with the Committee of Chemists of the GDMB, Gesellschaft der Metallurgen und Bergleute e.V., according to the principles laid down in the technical guidelines of the European Reference Materials<sup>®</sup> co-operation agreement between BAM-LGC-IRMM. Information on these guidelines is available on the Internet (<http://www.erm-crm.org>).

## ADDITIONAL INFORMATION

One laboratory determined iron and found 0.014 % mass fraction. The same laboratory determined manganese and found 0.03 % mass fraction.

## DESCRIPTION OF THE SAMPLE

This reference material is available in the form of round slices (15.8 mm diameter and 0.25 – 0.3 mm thickness) embedded in acrylic glass discs with 40 mm diameter and 5 mm thickness.

## INTENDED USE

This reference material is intended for use in X-ray fluorescence spectrometry for calibration or quality control. In particular it was developed for calibration of hand held X-ray fluorescence spectrometers.

Information on how to compare an analytical result with the certified value can be found in ERM Application Note 1; [www.erm-crm.org](http://www.erm-crm.org)

## MEANS OF ACCEPTED DATA SETS\*

Certified values  
Mass fraction in %

Line No.	Au	Ag	Cu	Ni	Zn
1	75.057	2.943	14.635	4.945	2.083
2	75.060	3.000	14.665	4.985	2.103
3	75.102	3.008	14.683	5.003	2.110
4	75.103	3.048	14.710	5.005	2.110
5	75.110	3.048	14.713	5.005	2.118
6	75.114	3.063	14.735	5.010	2.120
7	75.115				
8	75.152				
<i>M</i>	75.101	3.018	14.690	4.992	2.107
<i>s<sub>M</sub></i>	0.031	0.045	0.036	0.025	0.014
$\bar{s}_i$	0.056	0.019	0.070	0.024	0.017

The laboratory mean values have been examined statistically to eliminate outlying values.

*M* : mean of laboratory means

*s<sub>M</sub>* : standard deviation of laboratory means

$\bar{s}_i$  : square root of mean of variances of data sets under repeatability conditions

\*calculated using at least 2 but normally 4 single values

## PARTICIPANTS

- Allgemeine Gold- und Silberscheideanstalt AG, Pforzheim (Germany)
- AMI Doduco, Pforzheim (Germany)
- Forschungsinstitut Edelmetalle & Metallchemie, Schwäbisch Gmünd (Germany)
- Heimerle + Meule GmbH, Pforzheim (Germany)
- Heraeus Precious Metals, Hanau (Germany)
- Institut für Materialprüfung Glörfeld GmbH, Willich (Germany)
- SAXONIA Edelmetallrecycling GmbH, Halsbrücke (Germany)
- Wieland Edelmetalle GmbH, Pforzheim (Germany)
- Zentralamt für Edelmetallkontrolle, Bern (Switzerland)

## ANALYTICAL METHOD USED FOR CERTIFICATION

Element	Line no.	Method
Au	1, 2, 3, 4, 5, 6, 8 7	fire assay ICP-OES after dissolution in aqua regia
Ag	1, 2, 3, 4, 5, 6	ICP-OES after dissolution in aqua regia
Cu	1, 2, 3, 4, 5, 6	ICP-OES after dissolution in aqua regia
Zn	1, 2, 3, 4, 5, 6	ICP-OES after dissolution in aqua regia
Ni	1, 2, 3, 4, 5, 6	ICP-OES after dissolution in aqua regia

### Abbreviations:

ICP-OES                      Inductively coupled plasma optical emission spectrometry

## INSTRUCTIONS FOR USE

The material can be used without any sample pre-treatment. Touching the sample surface should be avoided. If necessary the surface can be cleaned with pure ethanol.

## STORAGE

The material should be stored at ambient conditions in a dry and clean environment.

## TECHNICAL REPORT

A detailed technical report describing the analysis procedures and the treatment of the analytical data used to certify ERM<sup>®</sup>-EB507 is available on request.

Supply of Reference Materials by BAM Bundesanstalt für Materialforschung und -prüfung:

Richard-Willstätter-Str. 11. D-12489 Berlin. Germany

Phone: +49 30 8104 2061

e-mail: [sales.crm@bam.de](mailto:sales.crm@bam.de)

Fax: +49 30 8104 1117

internet: [www.bam.de](http://www.bam.de)