MBH ANALYTICAL LTD

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CERTIFICATE OF ANALYSIS

82X PAG0.9 (batch A)

Reference Material Information

Type:	LEAD WITH SILVER (CAST)
Form and Size:	Disc 40mm Diameter x 15mm Thickness
Produced by:	MBH Analytical Ltd
Certified and supplied by:	MBH Analytical Ltd

Assigned Values

Percentage element by weight

Element	Ag
Value [1]	**0.903**
Uncertainty [2]	0.010

Definitions

1 The certified value is the present best estimate of the true content for silver. This value is based on the average of multiple tests performed by a single laboratory.

2 The uncertainty value has been generated by an assessment of the various sources of potential error within the analytical process.

Certified by:

MBH ANALYTICAL LIMITED _____ on 28th May 2009

C Eveleigh

Method of Preparation

This reference material was produced from commercial purity lead and 999.9 silver. The melt was cast by sequential transfer of aliquots into individual iron moulds. Approximately 1mm has been removed from the working face of each disc, to minimise any surface effects.

Sampling

Samples for chemical analysis were taken from the cast face of one disc. Otherwise, 20% of all discs were selected for non-destructive homogeneity testing.

Homogeneity

The discs were checked for sample and batch uniformity using an optical emission spectrometer. Each face was sparked 5 times. Some minor local segregation was noted, but it did not exceed 5% (RSD) within any one disc. Using the combined data for each surface, statistical analysis showed that there was no gross segregation for Ag, within the batch.

A vertical test on one disc showed that the first 10mm of the disc was homogeneous (as determined for the specific sample size taken by the spectrometer), and thereafter some segregation was evident. This certification is therefore only applicable to the first 10mm of the disc – the remaining 5mm is not certified.

Chemical Analysis

Analysis was carried out on millings taken from one sample representative of the product. It was performed by a single laboratory with accreditation to EN ISO/IEC 17025 - 2000, using documented standard reference methods and validated by appropriate reference materials.

Traceability

The analytical work performed to assess this material has been carried out by one laboratory with proven competence, as indicated by accreditation to ISO 17025. It is an implicit requirement for this accreditation that analytical work should be performed with due traceability, via an unbroken chain of comparisons, each with stated uncertainty, to primary standards such as the mole, or to nationally- or internationally-recognised reference materials.

Usage

Intended use:	With optical emission and X-ray fluorescence spectrometers.
Recommended method of use:	Lead and its alloys are generally prepared by machining on a lathe. However, users are recommended to follow the calibration and sample preparation procedures specified by the relevant instrument manufacturer. Preparation should be the same for reference materials and the samples for test. A minimum of five consistent replicate analyses is recommended to provide the necessary sample size. Users are advised to check against possible bias between reference materials and production samples due to differences in metallurgical history, and be aware of possible inter-element effects.

Participating Laboratory

Universal Scientific Laboratory Pty Ltd	Milperra, NSW, Australia	NATA accreditation 0492

Analytical Method Used

Silver was analysed by flame Atomic Absorption.

Notes

This material is liable to superficial corrosion, and there is some possibility of microstructural changes due to recrystallisation; however, it will otherwise remain stable provided adequate precautions are taken to protect it from cross-contamination, extremes of temperature and atmospheric moisture. All production records will be retained for a period of 20 years from the date of this certificate. This certification will therefore expire in May 2029, although we reserve the right to make changes as issue revisions, in the intervening period.

The manufacture, analysis and certification of this product were supervised by C Eveleigh, PhD, Technical Director, MBH Analytical Ltd. The material to which this certificate of analysis refers is supplied subject to our general conditions of sale.