

# African Mineral Standards

## *Certificate of Analysis*

Gold Ore Reference Material.  
medium grade, BIF matrix;  
from Mupane Gold Mine,  
Botswana.

AMIS0043

## **Recommended Concentration and two “Between Laboratory” Standard Deviations**

### *Certified Concentrations*

Gold:  $1.65 \pm 0.17$  g/t

Specific Gravity:  $3.02 \pm 0.20$  g/cc.

**Intended Use:** AMIS0043 is suitable for monitoring the accuracy of a single analysis of gold ores hosted by siliceous matrix rocks. The material can be used for routine quality control by inserting within a batch of samples, method development and for the calibration of equipment.

The recommended mean and "Between Lab" standard deviations for this standard reflect the average results from the laboratories that participated in the round robin. Slight variations in analytical procedures between laboratories will reflect as slight biases to the recommended concentrations and this is acceptable. Good laboratories however will report results within the two standard deviation levels with a failure of <10 %.

**Origin of Material:** This standard was made using ore sourced from the lamgold Corporation - Mupane Gold Mine, situated 30km south east of Francistown, northeastern Botswana. The gold at Mupane is hosted by a graphitic Banded Iron Formation (BIF) found in the Tati Greenstone Belt (TGB), an isolated remnant of Archean volcanics and sediments on the far western edge of the Zimbabwe Craton. This ore is from 60m depth in the Tau Pit.

**Approximate Mineral and Chemical Composition:** The Mupane Mine is hosted by metasediments within the TGB. The host rock is a graphitic BIF unit with a cherty stockwork of quartz carbonate veins and veinlets with thick lenses of oxide facies BIF. Sulphides are un-oxidised and comprise mainly arsenopyrite with minor pyhotite and pyrite and traces of chalcopyrite, sphalerite and magnetite. Alteration comprising silicification and carbonatation (dolomite-ankerite) along with minor biotisation usually accompanies the mineralisation. Gold occurs predominantly as <40µ grains partially encased in the arsenopyrite (minor Au is free, minor Au is wholly encased).

The major element chemistry has been determined from the average of two analyses by X-Ray Fluorescence Spectrometry. Arsenic content has been determined by fusion ICP.

SiO <sub>2</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	SO <sub>3</sub> %	CaO %	S %	MgO %	Al <sub>2</sub> O <sub>3</sub> %	C %
61.7	19.8	7.7	4.1	3.3	2.6	2.3	2.0
MnO %	K <sub>2</sub> O %	Na <sub>2</sub> O %	TiO <sub>2</sub> %	P <sub>2</sub> O <sub>5</sub> %	LOI %	As ppm	
1.2	0.3	0.1	0.1	0.1	4.5	4953	

**Appearance:** The material is a very fine reddish brown powder.

**Method of Preparation:** The material was crushed, dry-milled and air-classified to 100% <54µm. Wet sieve particle size analysis of random samples confirmed the material was 100% <54µm. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Explorer Packs are subdivided from the Laboratory packs as required. Samples were randomly selected for homogeneity testing and third party analysis. Statistical analysis of both homogeneity and the consensus test results were carried out by independent statisticians.

**Method of Analysis:** ICP-OES or ICP-MS, Pb collection for Au. Specific gravity either by gas pycnometer or by water displacement using a pycnometer bottle.

**Method of Certification:** Seventeen laboratories were each given eight randomly selected packages of sample. Results from the sixteen laboratories that reported back were used for the Au and SG determinations below:

Lab Code	Au, g/t	SG, g/cc
A	1.840	2.780
A	1.700	2.680
A	1.640	2.730
A	1.770	2.750
A	1.630	2.660
A	1.930	2.820
A	1.730	2.700
A	1.890	2.580
B	1.510	
B	1.595	
B	1.565	
B	1.595	
B	1.485	
B	1.610	
B	1.525	
B	1.635	
C	1.157	2.685
C	1.216	2.447
C	1.233	2.451
C	1.245	2.465
C	1.293	2.651
C	1.617	2.659
C	1.233	2.469
C	1.213	2.460
D	1.515	
D	1.545	
D	1.535	
D	1.590	
D	1.515	
D	1.605	
D	1.615	
D	1.485	
E	1.740	3.130
E	1.700	3.100
E	1.715	3.100
E	1.690	3.460
E	1.775	3.210
E	1.740	3.030
E	1.680	2.930
E	1.695	3.090
F	1.759	
F	1.744	
F	1.494	
F	1.751	
F	1.500	
F	1.878	
F	1.620	
F	1.846	
G	1.620	3.080
G	1.600	3.070
G	1.610	3.060
G	1.600	3.060
G	1.620	3.050
G	1.610	3.050
G	1.600	3.060
G	1.630	3.070
H	1.591	
H	1.716	
H	1.528	
H	1.495	
H	1.515	
H	1.664	
H	1.536	
H	1.545	
I	1.640	3.100
I	1.680	3.090
I	1.760	3.050
I	1.720	3.070
I	1.600	3.080
I	1.650	3.070
I	1.610	3.070
I	1.690	3.060

Lab Code	Au, g/t	SG, g/cc
J	1.713	
J	1.786	
J	1.673	
J	1.627	
J	1.680	
J	1.673	
J	1.786	
J	1.600	
K		
K		
K		
K		
K		
K		
K		
L	1.640	
L	1.500	
L	1.540	
L	1.520	
L	1.600	
L	1.560	
L	1.560	
L	1.600	
M	1.730	
M	1.660	
M	1.640	
M	1.560	
M	1.560	
M	1.640	
M	1.670	
M	1.710	
N	1.694	3.050
N	1.530	3.060
N	1.656	3.050
N	1.660	3.050
N	1.684	3.050
N	1.727	3.050
N	1.663	3.050
N	1.728	3.050
O	1.750	3.000
O	1.770	2.990
O	1.720	2.990
O	1.730	2.990
O	1.770	3.000
O	1.740	3.000
O	1.780	2.970
O	1.700	2.990
P	1.440	3.120
P	1.450	3.140
P	1.430	3.130
P	1.500	3.130
P	1.510	3.070
P	1.430	3.090
P	1.450	3.110
P	1.510	3.130
Q	1.743	
Q	1.790	
Q	1.877	
Q	1.750	
Q	1.727	
Q	1.717	
Q	1.790	
Q	1.693	
R	1.640	2.890
R	1.650	2.870
R	1.630	2.920
R	1.640	2.890
R	1.680	2.920
R	1.650	2.930
R	1.700	2.840
R	1.640	2.940

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean  $\pm$  2 Standard Deviations from all data. These outliers were removed from the data (italicized) and a new mean and standard deviation was determined. This method is different from that used to calculate the Confidence Interval shown on many Government-produced standards in that the actual "between-laboratory" standard deviation is used in the calculations. This produces upper and lower limits that reflect actual individual analyses rather than a grouped set of analyses. The limits can therefore be used to monitor accuracy from individual analyses, unlike the Certified Limits published on other standards which quote a Confidence Interval.

**Participating Laboratories:** (Not in the same order as in the table of assays)

1. ACME Analytical Laboratories Ltd., (Canada).
2. AGA - West Wits Laboratory, (South Africa).
3. AGA - Vaal River Laboratory (South Africa).
4. ALS Chemex South Africa ( Pty ) Ltd.
5. ALS Chemex, (Vancouver, Canada).
6. Ammtec Ltd., (Western Australia).
7. Anglo Research (Crown Campus, South Africa).
8. Assayers Canada, (Vancouver).
9. Genalysis Laboratory Services ( Pty ) Ltd., (Australia).
10. Assay Analytical Services ( South Africa )
11. Performance Laboratories, (South Africa).
12. Pt Intertek Utama Services (Intertek, Indonesia)
13. Set Point Laboratories ( Pty ) Ltd (South Africa)
14. SGS Lakefield Research Africa ( Pty ) Ltd. (Joburg, South Africa)
15. SGS Welshpool (Australia).
16. SGS Mineral Services - Barberton, (South Africa).
17. Ultra Trace ( Pty ) Ltd. (Australia)

**Availability:** This product is available in Laboratory Packs containing 1kg of material or in Explorer Packs containing client specified weights of material (from 50g up to 250g). Laboratory Packs are sealed bottles delivered in sealed foil pouches. Explorer Packs contain material in standard geochem envelopes placed into foil pouches that are nitrogen flushed and vacuum sealed.

**Legal Notice:** This certificate and the reference material described in it have been prepared with due care and attention. However AMIS, Set Point Technology (Pty) Ltd, Mike McWha, Dr Barry Smee and Smee and Associates Ltd; accept no liability for any decisions or actions taken following the use of the reference material.

28 March 2007

**Certifying Officers:**



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