

African Mineral Standards

Certificate of Analysis

Tantalum Reference Material AMIS0003

**Recommended Concentrations and two "Between
Laboratory" Standard Deviations**

Tantalum (Ta₂O₅): 583 ± 41 ppm

Intended Use: AMIS0003 is suitable for monitoring the accuracy of a single analysis of tantalum. 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 sample reject pulp material from an exploration program on a tantalum bearing pegmatite at Muiane, near Nampula in central Mozambique.

Method of Preparation: The material was crushed, to 95% passing a 75µ sieve, using an LM5 puck and ring mill. Samples were randomly selected for third party analysis. Statistical analysis of both homogeneity and the consensus test results were carried out by an independent statistician.

Method of Analysis: Fused disc XRF or ICP/MS.

Method of Certification: Five laboratories were each given ten randomly selected packages of sample. One of them provided four analyses from a different batch of duplicates. A sixth laboratory provided six analyses. Results were as set out in Table 1:

Table 1

AMIS0003 Round Robin	
Lab Code	Ta ₂ O ₅ , ppm
A	595
A	624
A	603
A	606
A	759
A	524
A	737
A	579
A	648
A	687
B	570
B	640
B	660
B	640
B	560
B	570
B	600
B	590
B	560
B	600
C	611
C	615
C	612
C	604
D	552
D	534
D	549
D	564
D	581
D	540
E	627
E	529
E	490
E	558
E	587
E	446
E	549
E	565
E	549
E	527
F	632
F	603
F	604
F	580
F	580
F	608
F	556
F	578
F	604
F	610
G	500
G	400
G	500
G	500
G	500

G	600
G	500
G	400
G	500
G	500

The recommended concentration and two 'Between Laboratory' standard deviations for Ta₂O₅ were determined using 'Analysis of Variance' ANOVA on the results from the 7 different sets of results analyzing splits from a bulk sample of ore.

For the ANOVAs the following statistical model was used for Ta₂O₅:

$$\text{Value} = \text{Lab}$$

Where

Value = Concentration measured.

Lab = Name of lab.

The ANOVAs were performed using the appropriate procedure in SAS1. There were 7 different sets of results analyzing splits from the homogenized bulk sample. The ANOVAs determined whether there were statistically significant differences between the mean results from the different labs. A statistical test, the Duncan multiple range test, which groups together those labs whose means are not significantly different from one another, was used to stack the results in descending order.

A Summary of the results from the ANOVA is given in Table 2.

Table 2 ANOVAs for AMIS 003

Lab	Number	Mean Ta ₂ O ₅ ppm	Std.Dev	Duncan Group
C	4	610.5	4.65	A
B	10	599	36.37	A
A	7	597	38.95	A
F	10	595.5	21.72	A
E	6	569.17	34.13	A and B
D	9	553.3	17.03	B
G	6	490	56.76	C
Total	52		36.59	
Std.Dev excluding C and G			30.91	
		Accepted value		
Mean		582.8		
Std.Dev		20.5		
CV%		3.52		

The results from those labs that are shaded are excluded from the calculations of the calculated mean. The Lab C results where only 4 samples were analyzed were rejected as these were

¹ SAS System. An integrated system of software providing complete control over data management, analysis control and presentation. Release 8.2 2001 Cary, NC USA

repeat assays. Lab G was rejected because their results were in Duncan Group C which was unconnected to the other Duncan Groups.

Duncan Group B was connected to Duncan Group A via Lab E.

The rejection of Labs C and G has the effect of changing the within lab standard deviation from 36.59ppm to 30.91 ppm.

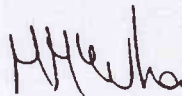
Participating Laboratories: (Not in same order as in the table of assays)

ALS Chemex (Pty) Ltd
University of Pretoria Faculty of Natural and Agricultural Sciences XRD and XRF facility.
Set Point Laboratories (Pty) Ltd
SGS Lakefield Research Africa (Johannesburg)
SGS Welshpool Minerals (Perth, Australia)
Ultra Trace (Pty) Ltd


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 Hugh Bartlett; accept no liability for any decisions or actions taken following the use of the reference material.

4 June 2005

Certifying Officers:



African Mineral Standards: _____
Mike McWha
BSc (Hons), FGSSA, MAusIMM, Pr.Sci.Nat

Independent Statistician: _____

H. E. Bartlett
BSc, PhD, FSAIMM, Pr.Sci.Nat