



Certified Reference Material

Certificate of Analysis



Manufacturers Details

KLEN International (74) Pty Ltd
36 Hemisphere Street
Neerabup, Western Australia, 6031

PO Box 529
Wanneroo WA 6946

Concentration of Certified Analyte/s

Au	0.995 g/t (ppm)
CRM Type Sulphide	

Identifiers

Batch number : 73948
Stock Code Unit (2kg jar) : 22001051
Stock Code Unit (30g sachet) : 22001053
Stock Code Unit (50g sachet) : 22001055
Stock Code Unit (150g sachet) : 22001057
Date of Manufacture : December 2016
Certificate Period of Validity : 72 months

NB: For ease of documentation, only the larger pack size is referenced throughout the CoA. However, product making up all jars and sachets originate from the same batch number.

Intended Use

This product is for use as a reference material for monitoring and testing the accuracy of laboratory analysis of minerals and ores.

Analyte Data Table

Analyte	Certified Value g/t	Measurement Uncertainty g/t	Number of Laboratories
Au	0.995	0.024	24



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Notes related to information contained in the Analyte Data Table

Certified Value – (CV) is the mean of means from accepted values of all participating round robin laboratories.

Measurement Uncertainty - (MU) is a statistical measure of the variability associated with multiple procedures used, between unit and within unit inhomogeneity, and changes during storage and transport (unless the certification notes differences in method). MU *does not take into account* individual laboratory bias and also excludes results from laboratories who were considered to be outliers.

The MU reported for this reference material does not take into account the effects due to transport. Consequently adequate mixing in the container before use is recommended.

The long term stability of this product under recommended storage conditions is monitored.

Number of Laboratories – is the number of participating round robin laboratories who returned data that was included in the calculation of the CV and all subsequent statistics.

Homogeneity Testing

Homogeneity testing forms the initial acceptance for the suitability of each batch. The testing program has been designed by an independent statistician and is followed as part of KLEN's internal quality control procedures. The analytical data returned from homogeneity testing is statistically analysed to confirm suitability for advancement of the batch to the round robin stage of testing at multiple laboratories.

Homogeneity Test Results

Analyte/s of interest	Au
Number of samples tested	30
Duplicate assays performed on each sample	Yes
Number of outlying results rejected	Nil
Mean (ppm)	0.998
Relative standard deviation	3.25 %



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Additional Statistical Data

Standard Deviation g/t	Relative Standard Deviation %	95% Measurement Confidence Interval g/t
0.039	3.9	$0.995 \pm 2 * 0.024$

Notes related to information contained in the Additional Statistical Data Table

Standard Deviation – the Standard Deviation is the standard deviation of the laboratory means provided by the participating round robin laboratories, excluding any outlying results.

Relative Standard Deviation – the Relative Standard Deviation is the Standard Deviation value divided by the CV

95% Measurement Confidence Interval - is the $CV \pm 2 * MU$ based on the accepted data provided by the participating round robin laboratories. An unbiased laboratory, using the same analytical method and instrumentation, should be able to achieve a result within the quoted interval 95% of the time. It is *not* an indication of the control limits or variability that any given laboratory may choose to impose, or achieve, for their own testing and unique situation. The 95% Confidence Interval excludes any outlying laboratory results.

Compliance with ISO Guides

KLEN manufacture all CRM's in accordance with the following ISO Guides;

- ISO Guide 31-2015 Reference materials - Contents of certificates labels and accompanying documentation
- ISO Guide 34-2009 General requirements for the competence of reference material producers
- ISO Guide 35-2006 Reference materials - General and statistical principles for certification

Round Robin Laboratories

Samples of batch 73948 were taken in accordance with the sampling plan and placed in heat sealed foil sachets. Each sachet contained sufficient sample to allow duplicate assays to be performed. The samples were distributed to 30 participating laboratories for round robin analysis, 27 of which returned results within the time period. After analysis of the results, 3 laboratories were removed as statistical outliers. Laboratories were requested to perform fire assay analysis using 50 gram sample weights. Final analysis was achieved via each laboratories routine instrument finish.

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Participating Laboratories

Company	Location		Country
Goldfields Ghana	Tarkwa		Ghana
Newmont Mining - Phoenix Mine	Battle Mountain	Nevada	USA
PT Intertek Utama Services	Pekayon, Pasar Rebo	Jakarta Timur	Indonesia
Swastika Lab LTD.	Swastika	Ontario	Canada
Accurassay	Thunder Bay	Ontario	Canada
Inspectorate de Mexico SA de CV	Hermosillo	SON	Mexico
Intertek Minerals	Maddington	WA	Australia
Activation Labs	Thunder Bay	Ontario	Canada
SGS Canada Vancouver	Burnaby	BC	Canada
Skyline Assayers & Laboratories	Tucson	Arizona	USA
Activation Labs	Kamloops	BC	Canada
Activation Labs Coquimbo	Coquimbo		Chile
Inspectorate America Corporation	Sparks	NV	USA
Activation Labs	Ancaster	Ontario	Canada
American Assay Laboratories	Sparks	Nevada	USA
Semafo		Ouagadougou	Burkina Faso
ALS Chemex (Orange)	Orange	NSW	Australia
ALS GLOBAL (Vancouver)	North Vancouver	B.C.	Canada
MinAnalytical	Perth	WA	Australia
Wesdome Gold	Wawa	Ontario	Canada
Suriname Gold/Newmont	Paramaribo		Suriname
Superlabs	Klerksdorp	Springs	South Africa
Intertek Minerals		Accra	Ghana
Newmont Mining - Twin Creeks Mine	Golconda	Nevada	USA
ALS Chemex (Malaga)	Malaga	WA	Australia
Kappes, Cassidy & Associates	Reno	Nevada	USA
Superlabs	Nuffield	Springs	South Africa
ALS Chemex (Townsville)	Townsville	QLD	Australia
Newmont Mining	Carlin	Nevada	USA
ALS Minerals	Reno	Nevada	USA



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Minimum Sample Size

The majority of laboratories utilised 50 gram sample weights for Gold analyses as requested. Non-outlying data from laboratories that used 30gram sample weights has been included in the statistical analysis.

While lower sample weights may be employed, the certified value and its associated uncertainty are not guaranteed where less than the following sample weights are used:

- Gold (non-gravimetric) 30 grams

General Product Description

KLEN CRM's are manufactured from blended raw materials to provide a suitable substrate for the analytes of interest. Substrates will vary to provide a background matrix as may be required or suited for particular applications. Starting materials are oven dried for a minimum of 24 hours to remove any moisture. Dried material is then milled and screened to ensure no oversize particles or product agglomerations are present. Required analytes are treated in a similar fashion to ensure they match the particle size of the substrate and can be uniformly distributed throughout the batch.

Instructions for Storage Handling and Use

KLEN CRM's are provided in hermetically sealed jars or sachets. Unopened containers should be stored in a cool dry place. Jar contents should be mixed thoroughly on opening before use. Once jars are opened, the contents can be protected by resealing the inner packaging using the bag clip provided, prior to securely replacing the lid on the container. After opening, jars should be stored in a cool dry place. Sachets are designed for immediate use once opened.

Safety Data Sheet (SDS)

The SDS for the product is available on line from the KLEN website at www.klen.com.au
Direct access is provided via the QR code below.



http://www.klen.com.au/CRM/Certificates_of_Analysis/SDS_22001051_Sulphide.pdf

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Product Certification

Batch 73948 was packed into 507 jars and samples were taken in accordance with a random sampling plan as developed by external statisticians. Four samples were then sent to each of 30 participating laboratories for analysis in duplicate. Samples were analysed using fire assay with the instrument finish being left to each laboratory.

Use of Certified Data

The certified value/s provided within this document are entirely reliant on the data returned from the participating testing laboratories. Analysis of the data is conducted by a third party statistical service who acts independent of KLEN International (74) P/L. Determining the suitability of this product shall be the sole responsibility of the user and application of information contained within this document is at the sole discretion of the user. Through receipt and application of the information contained herein, the user indemnifies and releases both KLEN International (74) P/L and the Centre of Applied Statistics, University of Western Australia from any claim arising from use, application, and any subsequent actions related to the certified data. No warranty either expressed or implied other than the fitness for sale to the above specification is made.

Independent Statistical Analysis

All raw and unaltered data returned from participating round robin laboratories is made available simultaneously to KLEN International (74) P/L and an independent statistical service. Once data returns are complete, analysis is conducted by the independent statistical service and all critical statistical figures are finalised. Statistical data from the final independent analysis are utilised in this report.

Statistical & Administrative Certifications

We the undersigned verify that the information contained within this certificate is a true and accurate representation of the product described herein.

Dr Alethea Rea BSc (Hons) PhD
Research Fellow, Centre of Applied Statistics
University of Western Australia

Mr B. van Blommestein MRACI C CHEM(A)
Chemist
KLEN International (74) Pty Ltd



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Revision Information

ver 1.1	Revision Date :	July 2018
	Revision Summary:	Replacement of standard error with measurement uncertainty in analyte data table. Various amendments and inclusions in order to comply with requirements of ISO 17034 accreditation.
ver 2.0	Revision Date:	April 2020
	Revision Summary:	Extension of Period of Validity of Certificate of Analysis on the basis of stability testing undertaken in accordance with the requirements of ISO 17034.

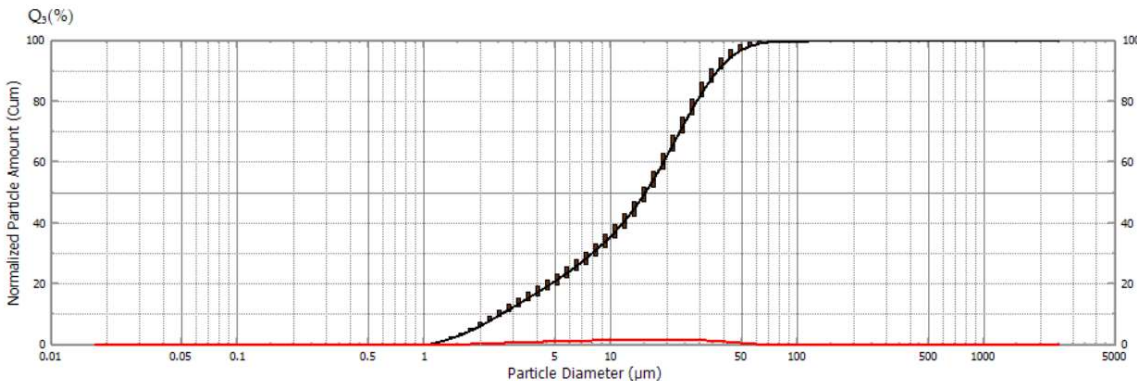
SUPPLEMENTARY INFORMATION

NB: The test results that follow are outside the scope of accreditation for ISO 17034, and are included for information purposes only.

Particle Size

Particle size analysis was performed on 5 samples of SKU 22001051, batch number 73948, using a Shimadzu SALD-2300 laser diffraction particle sizer with SALD-DS5 dry injection, sample introduction unit.

The results for 5 samples showed 95% of particles passing 44.5 micron.



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Product Description

SKU 22001051 batch number 73948 is a dry and uniform powder with a light grey colour. The chemical composition was determined by XRF analysis as follows;

Content	%
SiO ₂	59.41
Al ₂ O ₃	16.1
CaO	3.48
Fe	5.17
K ₂ O	3.97
MgO	1.9
Na ₂ O	4.87
P	0.060
TiO ₂	0.64
Cl	0.01
S	2.54
LOI	1.98
Moist	0.17

Typical Geological Analysis

X-Ray diffraction analysis provided the following crystalline and amorphous content information.

Phase	Formula	wt %
Amorphous content		<10
Augite	(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al) ₂ O ₆	< 15
Ilmenite	FeTiO ₃	<5
Magnetite	Fe ₃ O ₄	<5
Pyrite	FeS ₂	<10
Quartz	SiO ₂	<5
Sodium Calcium Plagioclase	(Na,Ca)(Al,Si) ₂ Si ₂ O ₈	40 -50

