

# Reference Material Product Information Document: <4mm Crushed Basalt PBS-425

*Table 1: PBS-425 Informational Values*

Analyte	unit	Average Value (y)	No. of Labs	No. Samples
Au	mg/t	2	12	60
Pt	mg/t	<5	11	55
Pd	mg/t	<2	10	50
Al <sub>2</sub> O <sub>3</sub>	%	13.88	1	1
BaO	%	0.02	1	1
CaO	%	7.69	1	1
Cr <sub>2</sub> O <sub>3</sub>	%	0.03	1	1
Fe <sub>2</sub> O <sub>3</sub>	%	16.85	1	1
K <sub>2</sub> O	%	0.48	1	1
MgO	%	4.43	1	1
MnO	%	0.2	1	1
Na <sub>2</sub> O	%	2.43	1	1
P <sub>2</sub> O <sub>5</sub>	%	0.179	1	1
SO <sub>3</sub>	%	0.19	1	1
SiO <sub>2</sub>	%	50.7	1	1
TiO <sub>2</sub>	%	1.69	1	1
LOI1000	%	1.02	1	1

Note 1. SI units equivalent: 1 ppm, parts per million  $\equiv$  grams per ton  $\equiv$  mg/kg  $\equiv$  ug/g  $\equiv$  0.0001 % w/w  $\equiv$  1000ppb, parts per billion

Note 2. The number of decimal places quoted does not imply accuracy of the value to this level but are given to minimise rounding errors when calculating 2SD and 3SD.

## Version History

Batch	Author	Document Version	Date	Modifications
PBS-425	H.Ooi	R0	14/05/2024	Initial Document
PBS-425		R1	7/06/2024	Remove SD values

## Introduction

This document specifies preparation, analysis, and characterisation of a crushed reference material.

## Material and Method of Preparation

PBS-425 batch specific parameters are summarised in Table 2. The material underwent drying, crushing and screening. During the drumming stage samples were collected for characterisation samples, these were drawn at pre-determined intervals.

The samples taken were randomised before being submitted to independent laboratories for inter-laboratory round-robin testing.

Table 2: Batch Specific Parameters

Production Summary	
Material Description	Basalt
Screening size (mm)	<4mm
Packaging size (kg)	300 kg drums
Characterisation Study	
Analytical Methods	Pb collection Fire Assay with ICP-OES & ICP-MS read: Au, Pt, Pd XRF Whole Rock Analysis
No. of Laboratories	12
No. samples per laboratory	5
No. determinations per sample	1
Sample Mass (kg)	1

## Material Characterisation and Certification Methodology

The process of characterisation was undertaken in accordance with ISO Guide 35:2017 and ISO17034:2016 following examination of laboratory results for potential technical failures. Where required, further investigation of outliers was conducted. Laboratory results deemed technical outliers were removed from the analysis pool prior to the determination of statistical parameters. The certifying officer, in some cases, may use their judgment in identifying or eliminating outliers outside of these statistical parameters.

- Analyte concentration value was determined by average of analysis values where no outlier results are present, or median of median for those with outlier laboratory results.
- Standard deviation (s) is the measure of spread of analyte determinations and includes inter-laboratory bias, method uncertainty, and material homogeneity uncertainty. Approximately 95% of determinations using the same analytical method are expected to be between two standard deviations either side of the certified value. The standard deviation is calculated from the validated laboratory group data less outlier laboratory and individual determinations.

The value of any elemental or oxide concentration may not be negative even though in some cases the uncertainty error bounds define a range less than 0%. These cases are due to low concentrations of some analytes relative to the analytical detection limits and increments of precision.

## Intended Use

This crushed reference material is intended for monitoring and testing of sample preparation and sub-sampling procedures. These crushed reference materials are typically used in conjunction with pulverised reference materials which monitor the analysis stage only.

The estimate of material and measurement uncertainties reported in this certificate are the product of the participating laboratory. Commercial laboratories typically have different measurement uncertainties to site-based laboratories. Application of the uncertainties reported in this certificate to a specific laboratory for ongoing QC may lead to many false reports of out-of-control processes, or alternatively non reporting of out-of-control processes.

It is recommended that the centre line and control limits of a Shewhart chart used for ongoing monitoring of a particular laboratory are derived from averaged values and variation from replicate analysis of this CRM after removal of outliers.

## Preparer and supplier of reference material

This reference material has been prepared and is certified by:

Independent Mineral Standards Pty Ltd  
16-18 Durham Rd  
Bayswater, WA 6053  
Australia  
[www.imstandards.com.au](http://www.imstandards.com.au)

## Period of Validity

This Certificate is valid 5 years from the date of original issue.

## Metrological Traceability

Metrological traceability of the informational values and their uncertainties listed in Table 1 have not been established, as values from laboratories and methods not accredited to ISO 17025 have been included in the characterisation studies.

## Stability and Storage Instructions

This reference material should be stored in a dry location out of direct sunlight to prevent degradation of the packaging and possible contamination of the materials. No other special storage conditions are required

## Legal notice

Independent Mineral Standards Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of ability. The purchaser by receipt hereof releases and indemnifies Independent Mineral Standards Pty Ltd from and against all liability and costs from the use of this material and information.

## Certifying officer

Bruce Armstrong

## Certification date

14<sup>th</sup> May 2024.

## References

ISO Guide 35:2017, Reference materials – General and statistical principles for certification.

ISO17034:2016, General Requirements for the competence of reference material producers.