



# METALLURGY

INDEPENDENT INSPECTION AND ANALYSIS SERVICES

# METALLURGY

**WE OFFER A WIDE RANGE OF INDEPENDENT METALLURGICAL SERVICES TO HELP ORGANISATIONS BETTER UNDERSTAND THE PHYSICAL AND CHEMICAL BEHAVIOURS OF THEIR COMMODITIES.**

We enable trade by providing fast, accurate and professional reporting to support our clients irrespective of location

## EXPERTS YOU CAN TRUST



ASMIN Industrial Limitada, part of the Alfred H Knight Group, is a consulting company in metallurgical processes, with over 15 years of experience serving the mining industry with offices in Santiago, Calama and Lima-Peru. Established in 1881, Alfred H Knight has been at the forefront of the metals and minerals industry providing inspection, analysis and technical consultancy and has built a reputation for delivering swift, accurate and reliable services.

Our network of highly-qualified experts is trusted by clients to provide key understandings of the physical and chemical behaviour of their metallic elements, intermetallic compounds and alloys. We produce technical feasibility studies to help clients design operational parameters, improve production and remove bottlenecks.

## COMMODITIES

- Metallic elements
- Intermetallic compounds
- Alloys

## SERVICES

Our team can provide the following services from our dedicated metallurgical, chemical, mineralogical laboratories and pilot plants:

- Laboratory tests: grinding, collective and selective flotation, sedimentation, rheology, filtration and hydrometallurgy
- Pilot tests: SAG grinding, conventional grinding, flotation, thickening, rheology, transport, pumping loop and deposition
- Comminution tests: JK Tech (DWT and SMC), Bond Crushing (LEIT), Bond Abrasion (Ai), SAG Grindability Test (TMS), Bond Bar (RWi), Bond Ball (BWi)
- Mineralogical analysis: QEMSCAN (PMA, BMA, TMS), X-ray diffraction (XRD) and traditional optical microscopy
- 800 mm high-pressure roller crushing pilot tests, HRC-800
- Comprehensive operation of metallurgical laboratories and samplers in plants
- Technical, process and metallurgical mining operation training
- Metallurgical mining services to support the Operation
- Sampling, diagnosis and optimization of plants
- Chemical and metallurgical characterizations
- Metallurgical control of plants

### LABORATORY TESTS, FOR CONCENTRATING PLANTS

- Ball bond test (BWi)
- Bond bar test (RWi)
- JK drop-weight test (DWT)
- Bond abrasion test (Ai)
- SAG Mill Comminution Test (SMC)
- Crushing Bond Test, (LEIT)
- SAG Grindability Test. (TMS)
- Semi-pilot pneumatic cell tests
- Trials with a regrind pilot mill
- Neutralization and coagulation tests
- Filtration tests under vacuum, pressure, and others
- Flotation tests, kinetics, open and closed cycle tests
- Deposit test in gutter, 2m long x 20cm wide
- Static and dynamic thickening and rheology tests, conventional type, high capacity, high density and paste

### TESTS FOR LEACHING PLANTS

- Crushing and grinding
- Granulometric analysis
- Diagnosis and evaluation of batteries
- Agglomeration and curing tests
- Determination of content and type of clay
- Iso-pH test: Extraction kinetics, Cu, Fe and impurities
- Acid consumption kinetics
- Cu balances by solid and solution
- Monitoring of electrochemical potential
- Tests on columns with and without recirculation
- Evaluation of binder and leaching additives
- Laboratory tests on bottles and percolators
- Cyanidation in columns, bottles and by agitation

### GEOMETALLURGICAL TESTS

We support organisations with the risk management and mitigation of their mineral processing plants by conducting extensive geometallurgical tests, including:

#### *Sulfurised Ore*

- Preparation of sample
- Crushing tests at a determined P80
- Grinding curves and lime consumption
- Comminution tests (BWi, CWi, DWT, SMC, Ai and TMS)
- Standard flotation, kinetic and fixed time tests
- Sedimentation tests and rheology measurements on tailings
- Optical chemical and mineralogical analysis and QEMSCAN

#### *Oxidised Ore*

- Preparation of sample
- Crushed to a certain size
- Sample classification
- Permeability test
- Column test
- Bottle test
- Iso-pH test
- Optical chemical and mineralogical analysis and QEMSCAN



**OUR TECHNICAL EXPERTS WORK TO RECOGNISED METHODS AND FOLLOW STANDARD OPERATING PROCEDURES.**

This enables us to deliver high quality, independent supervision and inspection services to our clients.



### MINERALOGICAL CHARACTERIZATIONS

We operate QEMSCAN scanning electron microscopes and XRD equipment, which enables our team of highly-trained experts to carry out mineralogical characterizations, including:

- Preparation of samples and briquettes
- Mineralogical analysis of particles, PMA
- Mass mineralogical analysis, BMA
- Mineralogical analysis of trace minerals TMS/SMS
- Field mineralogical analysis, FieldImage
- X-ray diffraction analysis, XRD
- Traditional optical microscopy analysis

### CHEMICAL ANALYSIS

Our parent company Alfred H Knight operates a dedicated chemical laboratory, accredited under the NCh-ISO 17025 standard, to carry out chemical analysis by:

- Atomic absorption.
- Gravimetry.
- Volumetry.
- Leco.
- ICP

### TECHNICAL CONSULTANCY

Our experts can provide consultancy and training on technical processes, metallurgical mining processes and operations.

#### *Technical, process and operational training*

- Crushing and classification
- Grinding and cyclone
- Reactive flotation
- Crushing and grinding Flocculation, sedimentation and thickening
- Filtration
- Optical and electronic mineralogy

#### *Diagnosis and optimization of plants*

- Crushing, grinding, classification, flotation, thickening and filtration
- Sampling of ore, concentrates and tailings at each stage of the process
- Global metallurgical balances or by process stage
- Optimization of circuits and/or unit operations
- Determination of critical foci of each circuit
- Sampling, diagnosis, optimization and operation of high-density Hi-Cap thickeners and paste
- Laboratory and pilot tests of conventional

thickeners, Hi-Cap, high density and paste.

- Optimization, selection, preparation, dilution and addition of flocculants
- Determination of unit areas and thickening capacities
- Thickener inventory measurement software, mass of fines, total solids, concentration gradient and granulometry, and total grades per thickener zone

#### *Mining operation support services*

Mining services to support the operation of mining plants:

- Pilot plant operation
- Plant metallurgical control
- Process quality control
- Sampling/monitoring of plants
- Quality assurance services
- Operation of comminution laboratories
- Support for the operation in leach pads
- Operation and control of deflotation laboratories
- Control activities for metallurgical balance
- Provision of professional metallurgical services
- Operation and quality control of geological samplers
- Support in the commissioning of new processes or plants

## KEY LOCATIONS

» We support organisations at each part of the supply chain, providing expert metallurgical services from strategically located laboratories across South America:



## OUR EXPERTISE

» ALFRED H KNIGHT (AHK) is a leading provider of inspection, testing and analytical services for the minerals and metals and solid fuels industry and has vast experience with a variety of materials throughout the global supply chain.

AHK operates a global network of experts with a well-earned reputation for providing reliable, professional services.

Whether you need our services at a mine site, load or discharge port receiving works or at other crucial points in the logistics chain, AHK can meet your needs.

- INSPECT
- TEST
- TRUST



**GET IN  
TOUCH**

ASMIN Industrial Limitada  
Metallurgical Services  
Antillanca Sur 561  
Parque Industrial La Boza  
Pudahuel  
Santiago  
Chile

[enquiries@ahkgroup.com](mailto:enquiries@ahkgroup.com)

[www.asmin.cl](http://www.asmin.cl)

[www.ahkgroup.com](http://www.ahkgroup.com)

© Alfred H Knight 2022

Alfred H Knight is a registered trade mark of  
Alfred H Knight Holdings Limited and its affiliates.

Kings Business Park, Prescot, L34 1PJ,  
United Kingdom.