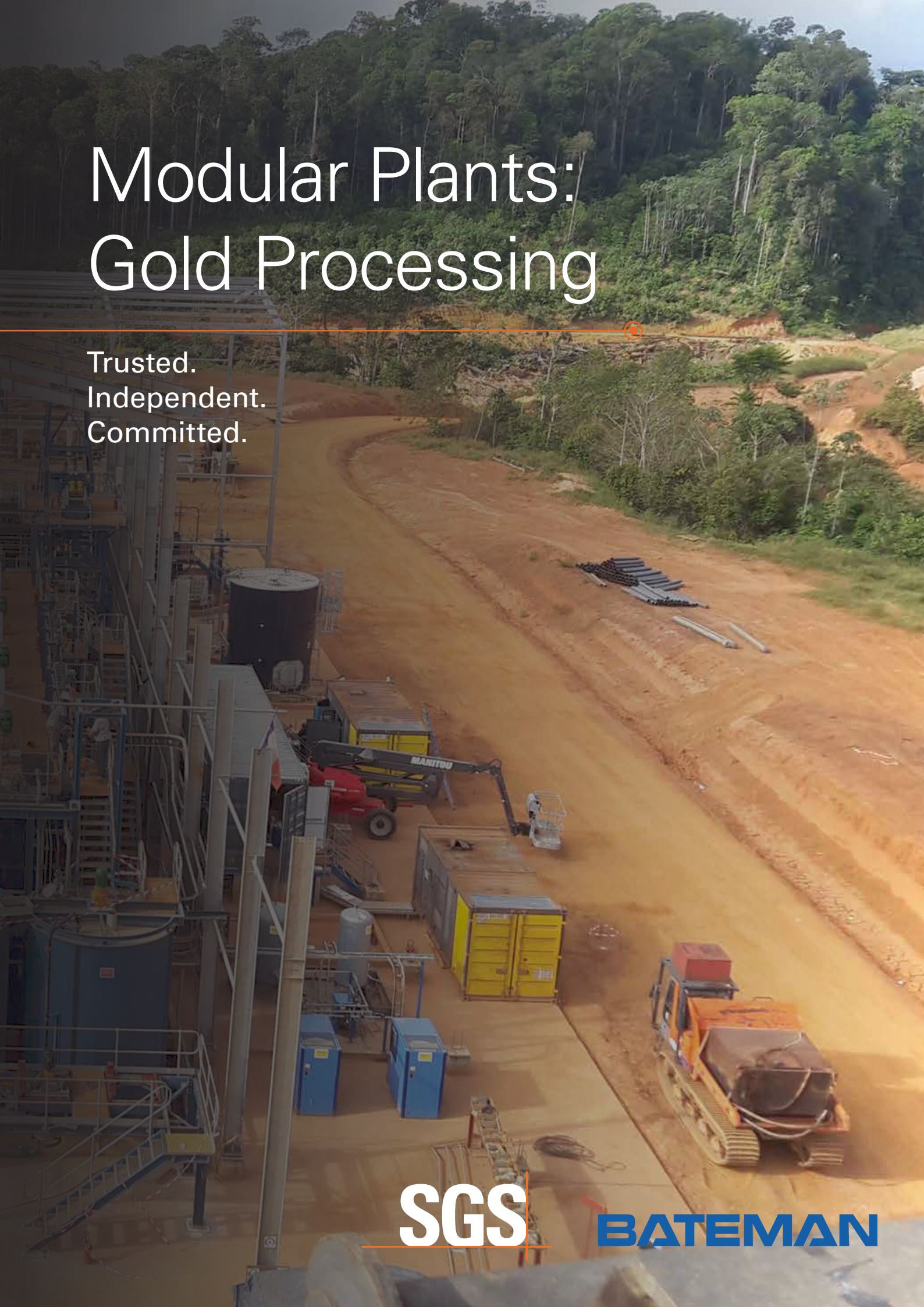
# Modular Plants: Gold Processing

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# Innovative Technological Solutions

## SGS Bateman Engineering Services modular plants offer innovative technological solutions as well as full process and commodity knowledge to the global mining industry.

Pioneering the concept in the 1960s, SGS Bateman offers competitive mineral processing plants that reduce risk, shorten project implementation and maximise returns in difficult project locations.

SGS Bateman modular plants are self contained or are integrated into conventional plants. They are used for prospecting, exploration, research, pilot plant and mineral processing on land or sea. The process design is robust and makes use of the best available components from reputable suppliers that support their products worldwide. This allows clients to be operational typically within 20 weeks after order placement, making it a preference for fast track projects.

Modular plants are easy to erect on site since they are trial erected and pre-commissioned at the factory, where they are marked, stripped and packed into containers, prior to dispatch to site.

Modular plants are used in the beneficiation and recovery of a wide range of commodities, including lithium, diamonds, coal, graphite, iron ore, copper, magnesite, andalusite, chromite, platinum and gold.



# Modular Gold Beneficiation Plants

Modular plants for extraction and recovery of gold are custom-designed for a specific application due to the characteristics of the gold bearing ore.
Benefits of modular plants for gold beneficiation are:

- Short construction times.
- Low capital costs.
- Easily movable.
- Additional modularised components can be incorporated later to increase plant through put or to accommodate higher beneficiation grades.
- Capacities of modular units ranging from 1 to 100 tonnes per hour (tph). Should higher capacities be required, units can be duplicated adjacent to each other to increase throughput.

During the design phase, potential processing routes are identified and evaluated to optimise gold beneficiation of the particular gold bearing ore.

Modular plants offer a complete solution from run-of- mine (ROM) reception, primary and secondary crushing, milling, gravity concentration when appropriate, flotation when appropriate and conventional leaching/adsorption/stripping plants where appropriate. All modules are connected by conventional belt conveyors and/or pipes and pumps.

## APPLICATIONS

- Fast-track operations.
- Sites where construction is difficult, e.g. remote locations with adverse climatic or geographic conditions.
- Relocation after economic reserves have been depleted.

Minimal rehabilitation of the site is required post mining operations.



# Feed Preparation

Energy and cost effective size reduction equipment is selected for crushing (primary and secondary) and milling. Mobility of the plant is also a key consideration when selecting size reduction equipment.
Depending on client requirements and ore characteristics, the following technologies are typically used for feed preparation:

- Jaw and cone crushers.
- Roller and Trunnion supported mills, semi autogenous grinding (SAG) mills, autogenous grinding (AG) mills, ball mills and rod mills.

## GRAVITY CONCENTRATION TECHNOLOGIES

During feed preparation, free gold in the -2 mm size range can be recovered with centrifugal concentrators where economical. Jigs can be used to recover free gold larger than 2 mm where economical.
The concentrate of the centrifugal gravity concentrators can be treated using:

- Shaking tables, or
- Intensive leach reactors.

## FLOTATION

Mill product can be processed using flotation if the gold is associated with sulphide minerals. Conventional or flash flotation technology (or a combination) can be used.

Flotation concentrate can be treated using:

- Intensive leach reactors (in conjunction with a regrind section).
- Intensive leach reactors (in conjunction with a roasting or oxidisation section).
- BIOX®.

## LEACHING/ADSORPTION

A high-intensity cyanide leaching concentrator is normally used to treat gravity and flotation concentrate, which reduces leaching times. Alternatively, conventional carbon-in-pulp (CIP) or carbon-in-leach (CIL) technology is used for leaching/adsorption.
In line with the modular philosophy, tanks are designed to minimise site construction and fabrication as far as possible.



# Gold Recovery

SGS Bateman supplies state-of-the-art modular gold products, such as elution, carbon regeneration and gold room facilities. Alternatively, the counter current decantation (CCD), filtration, "Merrill Crowe" route can be used, depending on the silver to gold (Ag/Au) ratio.

## MODULAR PLANT DESIGN

The modular plant design ensures:

- Fast delivery – popular choice for fast track projects.
- Competitive, efficient and cost- effective processing.
- Configuration and design to specific process and geographic requirements.
- Supply as stand-alone facilities or for incorporation into more permanent processing circuits.
- Pre-designed modules or custom designed units (fit for purpose).

SGS Bateman's Quality Management System is aligned to ISO 9001:2015.

## WASTE DISPOSAL

Using proven detoxification techniques, cyanide in process plant tailings is reduced to less than 50 ppm of free cyanide.



# Support Services

SGS Bateman offers a comprehensive range of support services:

- Spares and consumables: dispatched worldwide.
- Consulting and training: consulting services on aspects of processing; supervision of erection and commissioning; and training of operating personnel.

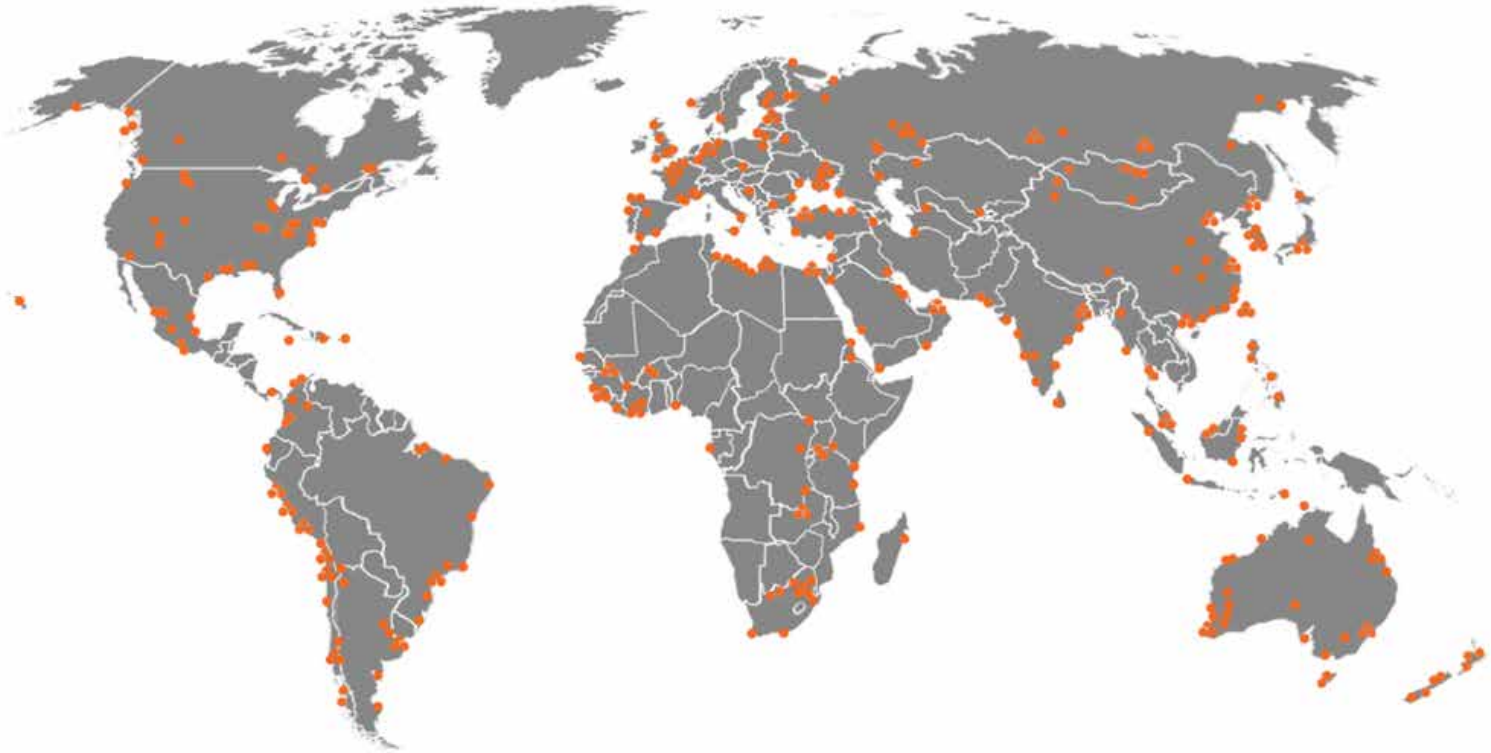
## BENEFITS OF MODULAR PLANTS

SGS Bateman offers a wide range of services:

- Pre-assembly and testing of all structures, equipment, piping and electrics
  - Eliminates on-site erection difficulties.
  - Reduces overall construction time.
  - Ensures reliable operation on commissioning.
- Ideal for remote sites with minimal infrastructure
  - All services provided in self- contained modules.
  - Containerised modules or modular gable coverings provide security and protection against the elements.
  - Low skill personnel required on site for re-assembly.
- Easy to transport, re-erect, operate and maintain
  - Partially assembled and transported in containers.
  - Designed to allow ease of maintenance.
  - Ergonomic design makes equipment readily accessible.
  - Minimal operator attention required, which is key where there are skills shortages.
  - Wear and corrosion-resistant construction materials.
  - Low maintenance components.
  - Modular structures ensure vibrations are contained.
- Prolonged service life and reliable operation
  - Fit-for-purpose design.
  - Hard wearing, corrosion-resistant, robust and proven components.
  - Equipment sourced from world-leading brands, which provide global support services.
- Low impact on the environment
  - Modules built on boxed steel skid frames, which minimise on-site concrete foundations.
  - Minimal site rehabilitation required post mining operations.

# Global Reach

SGS Bateman is part of SGS's unparalleled global network of over 150 commercial, on-site and mobile laboratories, 11 metallurgical facilities, 5 mineralogy facilities. Of these sites, 4 labs are fully integrated GEMM (geochemistry, environmental, metallurgy, mineralogy) labs (located in Canada, Chile and South Africa) and to provide integrated geochemistry metallurgy services (Peru and Russia). SGS Bateman has another process engineering office located in the United States.



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**TAKE YOUR NATURAL RESOURCES OPERATIONS TO THE NEXT LEVEL.**

**GET IN TOUCH TODAY.**



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