MINERALS
COMMODITIES

Accurate, unbiased sampling for precision and minimal risk.

Mechanical Sampling Systems

Understanding bulk material quality is key for commercial transactions, quality control and mineral balances. To eliminate penalties and maximize profits, it is important that Mechanical Sampling Systems (MSS) are built and operated correctly. A biased sampling method or sample preparation may result in an inaccurate determination of the value of your cargo or shipment. This results in the cargo being over or under-valued and the transaction being unfair to the buyer or seller. Decisions can become very costly if they are based upon biased, incorrect, or erratic data. For some materials, there are well established international standards (e.g. ISO and ASTM) that provide guidance for design of a MSS.

Unfortunately, for a number of minerals and materials, there are currently no international standards. However, there are well established test methods that can be used to determine the sampling requirements to achieve the necessary level of precision for any bulk material.

SGS has over 40 years of experience designing, constructing, installing and commissioning client-dedicated, site-specific MSS in more than 25 countries worldwide. Our experience with test methods can assist with mitigating MSS design issues.

We are able to meet unique design requirements with a full range of MSS equipment and turnkey construction capability. MSS can be seamlessly integrated into your handling facilities and processes. SGS provides trusted services from designing or sourcing equipment (based on system requirements and budget), to complete turn-key.

BULK SAMPLING

Sampling and analysis processes provide valid estimates for the desired quality parameters. There are, however, uncertainties associated with each estimate. Sampling statistics can often provide a means of calculating this uncertainty and evaluating the risks associated with the use of the sample results. SGS is the industry leader in bulk material sampling theory.

MECHANICAL SAMPLING SYSTEMS

Accurate sampling is a critical step in determining the value of a cargo. Risks associated with inaccurate sample results are minimized by utilizing an effectively designed, constructed and operating MSS. An MSS must be properly monitored to ensure it consistently provides accurate data. Mechanical sampling is recommended by ISO & ASTM over manual sampling for all commercial sampling. A MSS operation must include an on-going quality assurance program, including monitoring of the sampling ratio and periodic tests to ensure bias- free performance. In addition, SGS recommends precision testing an MSS to understand the uncertainty around each sampling result.

Services for new MSS

An MSS design requires detailed information about the sampling location and the material (e.g. top size, surface moisture content and material handling characteristics). A site visit is advised to ensure that the design meets ASTM or ISO standards, or any other specific requirements and design is suited for the intended use.

General points that SGS considers when designing an MSS are:

- Cutter widths should be at least 3 times the top size of the material.
- Samplers are designed to prevent bias due to rejection of a particle owing to its size.
- Chutes should have angles that promote material flow.
- There should be no choke points in the conveyors and chutes.
- The MSS should be as compact as possible, offering easy and safe maintenance.
- To be as airtight as possible to prevent drafting and moisture bias.
- Must have access doors to observe the system's performance, allowing verification that the cutters are cutting the entire stream material, moving at an appropriate speed and are not plugged.
- Comply with local safety requirements.
- Reliability, cost, & practical operational considerations must be optimized.

MSS built and operated by SGS in India

Our centers of design excellence

SGS has extensive, global MSS engineering design capabilities and established centers of design excellence in the following countries:

- Australia
- India

Products we cover

- Alumina
- Coal
- Bauxite
- Iron ore
- Coke and petcoke
- Wodchips
- Run-of-mine ores
- Mineral concentrates
- Fertilizers
- Limestone
- Grain and seeds
- Plastics and glass-cullet

Our services for existing MSS

- Inspection
- Bias testing
- Precision testing
- Sample collection and analysis
- Validation & Calibration
- Design with turnkey construction and commissioning
- Operational & maintenance services

BENEFITS OF USING MSS

Safety

- Elimination of manual sampling on conveyor belt notably reduces the risk of injuries.
- Remote operation, supervision.

Zero Bias

- All the requirements of probability sampling are met and equal. probability of selection for samples.
- Access to all the material.
- Particles not rejected owing to size.
- All sample increments are properly delineated.

Consistent

- Recognized by all international standards as the preferred method for commercial sampling.
- Reduces human error.

Cost effective

- Reduces the risk of penalties.
- Reliable material quality data.
- Process plant optimization and efficiency.
- Reduces manpower and time for sampling and sample preparation.
- Bias & precision can be measured.

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