

MECHANICAL SAMPLING SYSTEMS

THE VALUE OF USING AN SGS-DESIGNED MECHANICAL SAMPLING SYSTEM

Understanding your coal quality and sampling representatively is essential to eliminate penalties and maximize profits. SGS can work hand-in-hand with your operations to generate cost effective solutions for quality and address operational challenges.

SGS is synonymous with the highest levels of integrity, independence, impartiality and accuracy. Our services and industrial expertise help you improve your operational efficiencies and our global technical leadership helps minimize your operational and financial risk. Whether you need sampling, inspection or laboratory services, mechanical sampling systems, on-line analysis for blending and sorting support, our staff provides market leading experience and value to help you maximize your potential.

The value of a coal cargo is determined by testing a sample collected manually or by a mechanical coal sampling system. If the sampling method or the sample preparation is biased or inconsistent, the value of the cargo can be inaccurately or imprecisely determined. This results in the cargo being over-or under-valued and transaction is then unfair to either the buyer or the seller.

Costly decisions are often made based upon biased, incorrect, or erratic data. Coal is often a difficult material to sample because of its inherent heterogeneity with its inorganic and organic constituents. It can be widely variable with respect to size and chemical composition, varying in moisture, ash, and sulphur content in addition to its heating value. The process

for determining the quality parameters such as Gross Calorific Value (GCV) of coal begins with sampling, a process that requires adherence to established rules and guidelines given in ISO, ASTM and other published standards

SAMPLING

The processes of sampling and laboratory analysis provide valid estimates of the desired quality parameters. There are, however, uncertainties associated with each such estimate. Sampling statistics can often provide a means of calculating this uncertainty and a way to evaluate the risks associated with the use of the sample results.

The minimum mass of the gross sample should be sufficient to ensure that extraneous mineral and coal particles appear in the sample in the same proportions as in the lot from which the sample was collected. Sampling standards provide minimum numbers of increments to be collected at each stage of sampling. Attention must also be given to sample flows through the system so as to minimize the potential for sample moisture losses. SGS has years of experience in sampling and is a leader in the field of bulk material dynamic sampling theory.

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Proper sampling is the first critical step in determining the value of a cargo. Risk associated with inaccurate sample results are minimized by utilizing a well-designed and constructed mechanical sampling system (MSS). Such a system, well operated and monitored, will consistently provide accurate quality data. Mechanical sampling is generally preferred over manual sampling.



There is no human discretion involved in MSS, and the MSS will collect increments from any part of the lot. MSS systems can be expensive to purchase, install, and maintain, but the increased reliability, accuracy and precision are well worth the cost, especially if large amounts of coal are handled. Use of an MSS must include an on-going quality assurance program, including monitoring of the sampling ratio. The system should also be periodically bias-tested to assure bias-free performance.

SGS SERVICES FOR NEW MECHANICAL SAMPLING SERVICES

For a MSS design, detailed information is needed about the sampling location, the material to be sampled, including its top size, surface moisture content and material handling characteristics. An engineering site visit is required to assure the ultimate design will meet ASTM, ISO or other specific specifications and be suitable for the intended use.

General points that SGS considers when designing an MSS are:

- Cutter widths should be at least 2.5 times (three times is preferred) the top size of the material;
- 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, but be maintained easily and safely;
- The MSS should be as airtight as possible to prevent drafting. This will prevent moisture bias;

- The MSS should have access doors to observe the system's performance. These allow verification that the cutters are cutting the entire stream material, are moving at an appropriate speed and are not plugged; and
- Reliability, expense, and practical operational considerations must be optimized.

SGS SERVICES FOR EXISTING MECHANICAL SAMPLING SYSTEMS

SGS can provide the following services for MSS:

- Inspection;
- Bias testing;
- Sample collection and analysis;
- Validation;
- Calibration;
- Operation.

SGS has over 25 years' experience designing, installing and commissioning client-dedicated, site-specific mechanical sampling systems. There are over 300 SGS-designed systems operating in more than 20 countries worldwide and SGS can design a reliable, biasfree MSS for your operation as well. Experienced SGS sampling technicians, familiar with industry standards related to proper operation of mechanical sampling systems, are located in all major coal producing areas.



CONTACT INFORMATION

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