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Coal and coke — Mechanical sampling —

Part 8: Methods of testing for bias

Charbon et coke — Échantillonnage mécanique — Partie 8: Méthodes de détection du biais

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 27, *Coal and coke*, Subcommittee SC 4, *Sampling*.

This third edition cancels and replaces the second edition (ISO 13909-8:2016), which has been technically revised.

The main changes are as follows:

— the main title has been modified and aligned with the ISO 13909 series;

— requirements in reference methods have been clarified.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

It is not possible to lay down a standard method for field work by which a sampling procedure can be tested for bias, because details of the procedure will inevitably be affected by local conditions. However, certain principles can be specified which ought to be adhered to whenever possible and these are discussed in this document.

Testing for bias can be a tedious and expensive process. All bias tests therefore include a thorough pretest inspection, with appropriate action taken regarding any system deficiencies likely to cause bias.

In the text, the term “fuel” is used where both coal and coke would be applicable in the context and either “coal” or “coke” where only one is applicable.

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Coal and coke — Mechanical sampling —

Part 8:
Methods of testing for bias

1 Scope

This document sets out principles and procedures for testing the bias of test samples of coals or cokes, taken according to the ISO 13909 series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13909-1, *Coal and coke — Mechanical sampling — Part 1: General introduction*

ISO 13909-4, *Coal and coke — Mechanical sampling — Part 4: Preparation of test samples of coal*

ISO 13909-6, *Coal and coke — Mechanical sampling — Part 6: Preparation of test samples of coke*

ISO 13909-7, *Coal and coke — Mechanical sampling — Part 7: Methods for determining the precision of sampling, sample preparation and testing*

ISO 21398, *Hard coal and coke — Guidance to the inspection of mechanical sampling systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13909-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principles

The testing of a sampling system for bias is based on taking a series of pairs of samples of essentially the same fuel; one member of each pair being sampled by the system or component under test, the other member being obtained by a reference method. For each pair, the difference between the analytical results is determined. The series of differences between the analytical results thus obtained are subjected to statistical analysis.

The sensitivity of the statistical test is dependent on the number of pairs compared, the variability of the differences between members of the pairs, and the number of parameters used for the test.

The statistical analysis to which results will be subjected assumes the following three conditions:

— a multivariate normal distribution of the variables;

— independence of the errors of measurement for the individual parameters;

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— homogeneity of the data.

5 Pretest inspection

The primary sources of information regarding compliance with the sampling standard are the equipment specifications and drawings.

A thorough examination of the sampling system and a review of its component specification shall be made, in accordance with ISO 21398.

The party performing the test shall, however, verify performance by field measurements and observations. The operation of the sampling system shall be observed both dynamically with fuel flowing and statically with no fuel flowing. Some components will need to be actuated in static mode.

Pretest inspections of all operations and equipment, both static and under load, shall be carried out by persons experienced in the sampling of segregated, heterogeneous, and lumpy bulk materials. It is recommended that operation under normal conditions be observed for an entire lot.

Do not execute a test for bias until all conditions known to cause bias are corrected unless it is necessary to establish the performance of a system or component as it stands. In the latter case, the pretest inspection provides essential documentation of what the conditions were at the time of the test.

6 Reference methods

To test overall system bias, the use of a reference method which is known to be intrinsically unbiased is required. The preferred method is the stopped-belt method, i.e. the collection of increments from a complete cross-section of the fuel on the conveyor belt by stopping the belt at intervals. When properly collected from the primary fuel stream, the stopped-belt increment can be considered as a reference increment.

NOTE If it is not possible to collect stopped-belt increments, other reference methods can be used but, in these cases, an apparent absence of a lack of bias relative to the reference method can be inconclusive and the use of such methods can compromise the validity and authority of the findings.

With collection of stopped-belt increments, some disruption of normal operations can occur, and therefore, the plan of execution may need to be coordinated with the normal operations and organized to minimize such disruption. It must be recognized that the conveyor system involved may be used for only a few hours per day for normal operations and cannot be operated solely for bias tests unless the fuel can be diverted to another discharge point. This can extend the time necessary for completion of the field work and require special arrangements for supplying fuel to the system for testing.

Stopped-belt increments shall be taken with a sampling frame (see Figure 1), or equivalent, from a complete cross-section of the solid mineral fuel on the belt at a fixed position, for a length along the belt which is at least three times the nominal top size of the fuel.

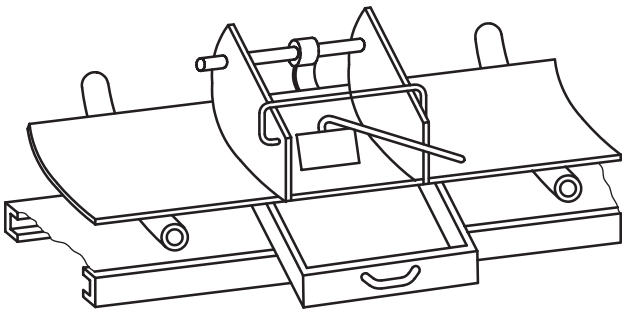


Figure 1 — Sampling frame

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